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Independent Technical Review and Resource Estimate

The Haib Copper Porphyry Project, Namibia.

For

Deep-South Resources Inc. 2906 West Broadway, Suite 162, Vancouver, BC. Canada V6K 2G8

Prepared by

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TABLE OF CONTENTS

| Section | Title | |
|---------|--|----|
| | Important Notice | 2 |
| 1. | Summary | 9 |
| 1.1 | Property Description, Location, Ownership & Access | 9 |
| 1.2 | History and Source of Data | 9 |
| 1.3 | Exploration Rights | 10 |
| 1.4 | Geology and Mineralisation | 10 |
| 1.5 | Exploration Drilling, Data Verification, Quality Assurance and Control | 10 |
| 1.6 | Mineral Resource Estimation | 11 |
| 1.7 | Interpretation and Conclusions | 12 |
| 1.8 | Recommendations | 12 |
| 2. | Introduction | 14 |
| 2.1 | Scope of Work, Terms of Reference and Purpose of the Report | 14 |
| 2.2 | Principal Sources of Information | 14 |
| 2.3 | Personal Site Inspection | 14 |
| 3. | Reliance on other Experts | 16 |
| 3.1 | Other Experts | 16 |
| 3.2 | Mineral Tenure | 16 |
| 4. | Property Description and Location | 17 |
| 4.1 | Exploration Licence – Rights and Obligations | 17 |
| 4.2 | Location | 19 |
| 4.3 | Project Ownership | 19 |
| 4.4 | QP's Comment | 19 |
| 5. | Accessibility, Climate, Local Resources, Infrastructure & Physiography | 21 |
| 5.1 | Physiography | 21 |
| 5.2 | Accessibility | 21 |
| 5.3 | Infrastructure | 22 |
| 5.4 | Climate | 22 |
| 5.5 | Sufficiency of Surface Rights | 22 |
| 6. | History | 23 |
| 6.1 | Sources of Historical Exploration Data | 23 |
| 6.2 | Early Mining | 23 |

| 6.3 | Post-1960 Exploration | |
|------|---|----|
| 6.4 | Historical Estimates | 28 |
| | 6.4.1 RTZ Historical Estimate | 28 |
| | 6.4.2 Venmyn Rand Historical Estimate | |
| | 6.4.3 NCJV/GFM Historical Estimate | 29 |
| | 6.4.4 Beare Dolbear Historical Estimate | 30 |
| 6.5 | QP's Comments on the various Models and Estimates | 31 |
| 7. | Geological Setting and Mineralisation | 33 |
| 7.1 | Regional Geology | 33 |
| 7.2 | Local Geology of the Haib Deposit | 39 |
| | 7.2.1 Structural Controls on Copper Mineralisation | 39 |
| 7.3 | The Haib Mineralisation Model | 42 |
| 8. | Deposit Type | 44 |
| 9. | Exploration | 45 |
| 9.1 | The Teck Exploration Programme | 45 |
| 9.2 | Teck's Geophysics Surveys | |
| 9.3 | Teck's Geochemistry Surveys | 49 |
| | 9.3.1 Stream Sampling | |
| | 9.3.2 Soil Sampling | |
| 9.4 | Teck's Geological Mapping | 49 |
| 9.5 | Teck's Other Targets | 49 |
| 10. | Drilling | 58 |
| 10.1 | Historical | 58 |
| 10.2 | Teck's Drilling | 61 |
| | 10.2.1 Teck's Protocol for Drillhole Surveys | 62 |
| | 10.2.2 Teck's Protocol for Drill logging and Sampling | 62 |
| | 10.2.3 Results | 63 |
| 10.3 | QPs' Comments | 63 |
| 11. | Sample Preparation, Analyses and Security | 69 |
| 11.1 | Historical Sampling | 69 |
| 11.2 | Teck Sampling | 69 |
| 11.3 | Sample Security | 71 |
| 11.4 | Data Verification | 71 |
| 11.5 | QP's Comments | 72 |

| 12. | Data Verification | 73 |
|------|--|-----|
| 12.1 | Historical Data Verification | 73 |
| 12.2 | Teck Re-sampling | 73 |
| 12.3 | Assessment of Quality Control Data | |
| | 12.3.1 Duplicate Samples | 74 |
| | 12.3.2 Blank Samples | 75 |
| | 12.3.3 Standard Samples | 77 |
| 12.4 | QP's Overall Interpretation of the QA/QC programme | 78 |
| 13. | Mineral Processing & Metallurgical Testing | 81 |
| 13.1 | Metallurgical Testwork | 81 |
| | 13.1.1 Historical Metallurgical Testwork – 1990's | 81 |
| | 13.1.2 Modern Metallurgical Testwork | 82 |
| | 13.1.3 Metallurgical Testwork Review & in Progress | 83 |
| 13.2 | QP's Comments | 84 |
| 14. | Mineral Resource Estimate | 85 |
| 14.1 | Introduction | 85 |
| 14.2 | Source Data | 85 |
| | 14.2.1 Drillhole Data | 85 |
| | 14.2.2 Three-Dimensional Models | 86 |
| 14.3 | Domain Selection | 87 |
| 14.4 | Statistical Analysis | 89 |
| | 14.4.1 Univariate Statistics | 89 |
| | 14.4.2 Grade versus Sample Width | 89 |
| | 14.4.3 Compositing | 90 |
| | 14.4.4 Grade Capping | 92 |
| 14.5 | Variography | 95 |
| | 14.5.1 Linear Semi-Variograms | 95 |
| | 14.5.2 Omni-Directional Semi-Variograms | 96 |
| | 14.5.3 Directional Semi-Variograms | 97 |
| 14.6 | Block Modelling | 99 |
| 14.7 | Specific Gravity | 99 |
| 14.8 | Estimation | 100 |
| 14.9 | Estimate Validation | 101 |
| | 14.9.1 Q-Q Plots | 101 |

| | 14.9.2 Swath Plots | | | |
|--|---|--|--|--|
| | 14.9.3 Comparison of Estimates, Informed Cells & Methodology | 103 | | |
| 14.10 | Block Model Sensitivity Analysis | 104 | | |
| 14.11 | Mineral Resource Classifications | 105 | | |
| 14.12 | Mineral Resource Statement | 108 | | |
| 14.13 | Areas of Uncertainty of Resource Estimates | | | |
| 15. | Adjacent Properties | 111 | | |
| 16. | Other Relevant Data and Information | 113 | | |
| 16.1 | General | 113 | | |
| 16.2 | QP's Comments | 114 | | |
| 17. | Interpretation and Conclusions | 115 | | |
| 17.1 | General | 115 | | |
| 17.2 | Significant Risks and Uncertainties | 115 | | |
| 17.3 | QP's Comments | | | |
| | | | | |
| 18. | Recommendations | 117 | | |
| 18. 18.1 | Recommendations General | 117 <i>117</i> | | |
| 18. 18.1 18.2 | Recommendations General Recommended Exploration Programme | 117 117 117 | | |
| 18. 18.1 18.2 18.3 | Recommendations General Recommended Exploration Programme QP's Comments | 117 117 117 118 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme QP's Comments References | 117 117 117 118 119 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme QP's Comments References | 117 117 117 118 119 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme QP's Comments References Authors' Certificates & Signatures | 117 117 117 118 119 123 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme OP's Comments References Authors' Certificates & Signatures | 117 117 117 118 119 123 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme OP's Comments References Authors' Certificates & Signatures Appendices 1, 2 & 3 - Details of Haib Minerals (Pty) Ltd.'s Exclusive Prospecting Licence 3140 | 117 117 117 118 119 123 127- 152 | | |
| 18. 18.1 18.2 18.3 19. | Recommendations General Recommended Exploration Programme OP's Comments References Authors' Certificates & Signatures Appendices 1, 2 & 3 - Details of Haib Minerals (Pty) Ltd.'s Exclusive Prospecting Licence 3140 | 117 117 117 118 119 123 127- 152 | | |
| 18. 18.1 18.2 18.3 19. Figures | Recommendations General Recommended Exploration Programme QP's Comments References Authors' Certificates & Signatures Appendices 1, 2 & 3 - Details of Haib Minerals (Pty) Ltd.'s Exclusive Prospecting Licence 3140 s appear within the body of the report and are listed over the page | 117 117 117 118 119 123 127- 152 ge | | |
| 18. 18.1 18.2 18.3 19. Figures Photographs | Recommendations General Recommended Exploration Programme QP's Comments References Authors' Certificates & Signatures Appendices 1, 2 & 3 - Details of Haib Minerals (Pty) Ltd.'s Exclusive Prospecting Licence 3140 s appear within the body of the report and are listed over the page 1 - 8 appear within the body of the report and are listed over the | 117 117 117 118 119 123 127- 152 ge ne page | | |

| Figure No. | Title | Page |
|------------|--|------|
| 4-1 | Locality Map | 20 |
| 6-1 | NCJV / GFM Open Pit Designs | 27 |
| 7-1 | Regional Geology Map | 34 |
| 7-2 | Geology Map of Haib | 35 |
| 7-3 | Geology Map showing the Intrusive Rock Units at Haib | 36 |
| 7-4 | Map showing the Regional Structural Geology & the location of other nearby porphyry deposits | 37 |
| 7-5 | Structural Geology of Haib Main | 38 |
| 7-6 | N-S cross-section Haib Main | 40 |
| 7-7 | Location Map – Haib Main & other targets | 41 |
| 9-1 | 3-D models of Haib Main | 47 |
| 9-2 | I.P. section through Haib Main | 48 |
| 9-3 | Alteration Geology of the Haib South Anomaly | 51 |
| 9-4 | Lithological Map of the Haib South Anomaly | 52 |
| 9-5 | Drillhole Location at the Haib South Anomaly | 53 |
| 9-6 | Geology and Vein Density Map of the Haib West Anomaly | 55 |
| 9-7 | Rock chip geochemistry of the Haib West Anomaly | 56 |
| 9-8 | Drillhole Location Map of the Haib West Anomaly | 57 |
| 10-1 | RTZ drillhole Locations in the Haib Deposit | 60 |
| 10-2 | Location Map of all drillholes in the Haib Deposit | 64 |
| 10-3 | Striplog of Diamond Drillhole TCDH06 | 68 |
| 12-1 | Q-plots comparing original & duplicate assays | 74 |
| 12-2 | Q-plots comparing crusher originals & duplicate assays | 75 |
| 12-3 | Graph of blank sample assay results | 76 |
| 12-4 | Graph of Standard sample assay results | 78 |
| 12-5 | Drillholes used with QA/QC applied | 79 |
| 12-6 | Q-plots of Cu results | 80 |
| 14-1 | Limits of geological modelling | 86 |
| 14-2 | 3-D models | 86 |
| 14-3 | Boundary analysis of Cu grades – inclined drillholes | 88 |
| 14-4 | Statistics for raw Cu & Mo grades | 89 |
| 14-5 | Scatterplots of Cu & Mo grades vs. sample width | 90 |
| 14-6 | Distribution of Cu & Mo grades for composite samples | 91 |
| 14-7 | Q-plots comparing Cu & Mo grade distributions | 92 |
| 14-8 | Cu% top-cut analysis raw vs. 10m composites | 93 |
| 14-9 | Cumulative frequency curves Mo analysed & 10m composites | 94 |
| 14-10 | Linear semi-variograms for Cu & Mo | 95 |
| 14-11 | Omni-directional semi-variograms for Cu & Mo | 96 |
| 14-12 | Directional semi-variograms showing all direction models | 97 |
| 14-13 | Isometric view looking NW showing Cu anisotropy | 98 |
| 14-14 | Normal Histogram of SG data | 100 |
| 14-15 | Q-plots comparing grade distributions composites & estimates | 102 |
| 14-16 | Swath plots showing trends in 10m composites & Cu estimates | 102 |
| 14-17 | Scatterplots ordinary kriging to inverse distance squared | 103 |
| 14-18 | Grade / tonnage curves of various cut-offs | 105 |
| 14-19 | Isometric & Sectional views: drill data & resource classification | 107 |
| 15-1 | Location of EPL 3140 and adjacent properties | 111 |
| | | |

| Photograph No | Title | Page |
|---------------|--|-----------|
| 1 | General View of the Haib Deposit illustrating the topography | 21 |
| 2 | The NCJV / GFM Adit - Central portion of the Haib Deposit | 25 |
| 3 | The Core Storage Area | 26 |
| 4 | RTZ Core in Racks | 26 |
| 5 | Haib South Anomaly Outcrop showing extensive alteration | 50 |
| 6 | Quartz veins at Haib West Anomaly | 54 |
| 7 | Drill rig on site at Haib Main | 61 |
| 8 | Metallurgical Sample Dump from the NCJV / GFM Adit | 81 |
| | | |
| Table No. | Title | Page |
| 1-1 | Haib Resource Estimate | 12 |
| 1-2 | Haib Indicated Mineral Resources, Sensitivity Cases | 12 |
| 1-3 | Haib Inferred Mineral Resources, Sensitivity Cases | 12 |
| 4-1 | Table of corner co-ordinates EPL 3140 | 17 |
| 6-1 | RTZ – Haib Historical Estimate | 28 |
| 6-2 | Venmyn Rand – Haib Historical Estimate | 29 |
| 6-3 | GFM / NCJV – Haib Historical Estimate | 30 |
| 6-4 | Behre-Dolbear - Haib Historical Estimate | 31 |
| 10-1 | Assay Intervals of Teck's Drillhole TCDH 06 | 63 |
| 10-2 | List of Teck Diamond drillholes with Significant Intersections | 65-67 |
| 12-1 | Summary of Standard samples used by Teck | 77 |
| 14-1 | Drill Statistics summary | 85 |
| 14-2 | List of modelling files from Teck | 87 |
| 14-3 | Summary univariate statistics by domain | 87 |
| 14-4 | Univariate statistics of 10m composites | 91 |
| 14-5 | Omni-directional variogram models – Cu & Mo by domain | 91 |
| 14-6 | Derived variogram models for Cu & Mo | 96 |
| 14-7 | Block model geometrical definitions | 99 |
| 14-8 | Summary of kriging inputs | 101 |
| 14-9 | Block model quantities and grades of Cu% cut-offs | 104 |
| 14-10 | Classified mineral resources at 0,25%Cu cut-off | 108 |
| 14-11 | Haib Indicated Mineral Resources, Sensitivity Cases | 109 |
| 14-12 | Haib Inferred Mineral Resources, Sensitivity Cases | 109 |
| 15-1 | List of adjacent Properties | 111 & 112 |
| 18-1 | Summary of HM Exploration Programme & Budget | 118 |

1. SUMMARY

1.1 Property Description, Location, Ownership and Access

This independent Technical Report has been prepared at the request of Deep-South Resources Inc (TSXV – DSM) ("DSM or The Issuer") which is listed on the TSX Venture Exchange (the "Exchange"). DSM has a 100% interest in Deep South Mining Company (Pty) Ltd. a Namibian subsidiary which has a 100% interest in Haib Minerals (Pty) Ltd ("HM") which in turn holds the exploration rights to the Haib Porphyry Copper property in the Karas Region, southern Namibia. Teck Resources Limited ("Teck") owns 35% of DSM. HM is the registered holder of Exclusive Prospecting Licence 3140 ("EPL") over the property.

The Haib deposit is a large palaeo-Proterozoic copper porphyry deposit, located in southern Namibia. Access to the Haib project camp-site is via a 10km graded gravel road from the main Cape Town – Windhoek north-south tar road and is accessible to conventional cars. Access from the camp-site to the main deposit area is along some 5km of tracks suitable for four-wheel drive vehicles. The site is very rugged and there is only limited access along numerous bulldozed tracks. The project area borders on both a summer and winter rainfall area, is very arid and in summer the temperature can go as high as the mid 40°C, while in winter it can go as low as freezing point. Average annual rainfall is 25-50 mm.

The main Haib deposit straddles the Volstruis River, a tributary of the Haib River, which is an ephemeral tributary of the Orange River which lies some 10-15 km south of the deposit. The deposit has a distinct surface expression with abundant copper staining on fractures and joint planes particularly in and around the dry river bed of the Volstruis River. It was discovered in the late 1800's / early 1900's.

1.2 History and Source of Data

This report is based on a review of historical and currently available data concerning the Haib property obtained from HM and from Mr. V. Stuart-Williams, who is familiar with the project based on numerous visits and direct involvement as geological consultant to the Namibian Copper Joint Venture ("NCJV") in the period 1995 to 1999 and since 2004 as the current Technical Director of DSM. The sections and paragraphs which describe the estimation of Resources at the Haib are the work of Mr. D.S. Richards of Obsidian Consulting Services ⁽¹⁾.

In 2008 DSM entered into a contract with Teck which offered Teck an option to obtain a major interest in the project in return for meeting certain exploration expenditure commitments. Teck fulfilled all of its commitments under the agreement and as a result 70% of the shares in HM were issued to Teck. In May 2017, Teck agreed to transfer ownership of their shares in HM to DSM in exchange for a 35% interest in DSM.

1.3 Exploration Rights

The exploration rights and obligations over the Haib property are held by HM under EPL 3140. This licence originally had an area of 74,563 ha and it incorporated all of the known mineralisation within the Haib deposit and a substantial area around the deposit. The EPL was renewed in April 2007, April 2009, April 2011, April 2013, April 2015 and April 2017. The current area, after reductions required in terms of the first renewal, is some 36,502 ha and the licence is valid until April 2019 (see Appendices 1, 2 & 3).

1.4 Geology and Mineralisation

The Haib deposit is located within part of the Richtersveld geological province ⁽³⁶⁾. The area lies within the Orange River Group volcanic suite of andesitic lavas, intercalated with acidic volcanics and tuffs, which were intruded by Vioolsdrif Intrusive Suite granites, granodiorites and adamellites dated around 1,880 Ma. The principal mineralised hosts at the Haib are a Quartz Feldspar Porphyry (QFP) and a Feldspar Porphyry (FP). The entire sequence has undergone low grade regional metamorphism to greenschist facies. At the Haib there is a further overprint exhibited by typical porphyry copper type alteration zones associated with this style of mineralisation.

The Haib copper deposit is an example of a Precambrian porphyry copper deposit. Porphyry copper deposits are a major world source of copper. It is in essence a very large volume of rock containing low-grade copper mineralisation.

1.5 Exploration, Drilling, Data Verification and Quality Assurance and Control

Five separate geophysical, geochemical and diamond core-drilling exploration programmes have been conducted at the Haib by Falconbridge (eleven drillholes); King Resources (twenty-one drillholes); Rio Tinto Zinc ("RTZ") (one hundred and twenty drillholes); the NCJV / Great Fitzroy Mines ("GFM") joint venture (12 drillholes); and Teck / HM (32 diamond drillholes).

The Haib Project drill hole database comprises data from a number of exploration phases completed over an extended period of time by multiple companies. Most of this work preceded the introduction of mineral resource reporting guidelines such as CIM, NI 43-101, JORC and others and as such are not supported by the requisite Quality Assurance and Quality Control programmes. While it is assumed this work was done to the international standards of the time, the work done by Teck from 2008 onwards utilised a full formal QA\QC programme and included the resampling of a significant portion (~8%) of the available RTZ core. Comparison of the Teck data to the historical data for the same sampled volume shows identical Cu grade distributions confirming, in the author's opinion, that the historical data is of a suitable quality for use in mineral resource estimation and reporting along with the Teck data.

1.6 Mineral Resource Estimation

In July 2017, Obsidian Consulting Services was contracted by DSM to compile a resource estimate for Copper ("Cu") and Molybdenum ("Mo") from various previously identified and modelled domains for their Haib Copper Project ⁽¹⁾. The assignment included the compilation and validation of a drill hole database derived from historical core drillholes and more recent core drillholes and check assays of historical core samples completed over the past 9 years by Teck Namibia.

Estimation was done using Ordinary Kriging in a step-wise manner. A first kriging run was done using a search equal to the variogram ranges. A second pass was then done using a search double the variogram ranges. Almost all cells were estimated by the above 2 steps. Any remnants were either kriged by opening the search and increasing the minimum samples or assigned a background value such as the median.

A boundary analysis showed a mineralisation trend that correlates with the mineralisation model of the Haib deposit viz. Cu porphyry. The changes in grade are generally gradational and cross lithological contacts therefore the use of lithological boundaries was felt to be inappropriate while the use of a grade cut-off based domain was considered arbitrary. Therefore, no domaining was applied in the mineral resource compilation with the extents being controlled by data proximity.

Ten metre composites were calculated from the drill hole data which approximates a horizontal grid of approximately 150m x 150m. Analysis of the composites showed that compositing does not fundamentally change the Cu grade distributions. Top cut analysis of the Cu grades showed the raw data to be relatively insensitive to the use of grade caps and no capping was applied during the compositing. The same is not true for the Mo dataset which is substantially smaller than that of Cu and includes qualitative visual estimates alongside quantitative analytical results. Confidence in the Mo data is therefore very low compared to Cu.

Variography revealed the presence of well supported spherical variogram models with anisotropic elements. The Cu values show that the maximum anisotropy is oriented along a strike of 135° dipping to the southwest at just under 60°. The Mo values show similar levels of anisotropy with a principal continuity direction of some 207°. Estimates were conducted in a stepwise manner first at the modelled Ranges followed by a second estimation run at 2x the Ranges. In the case of Cu, 99% of the block model cells were estimated within the Ranges while for Mo this was some 85%. Anomalously high grades were used as is but had their volume of influence significantly reduced to avoid overestimation and the introduction of bias. During estimation, the quality of the estimates was tracked using kriging parameters such as kriging variance, slope of regression and kriging efficiency. Post-estimate validations were done use QQ Plots, Swath Plots and comparison with nearest neighbour and inverse distance estimates.

Density was not estimated but rather an average of 2.8T/m³ taken from the mean of the 99 Specific Gravity determinations that had been done. These

showed a normal distribution around a mean of 2.75 T/m^3 with a very low coefficient of variation (0.04) therefore the default density approach is considered appropriate.

The mineral resources for Haib have been classified according to the guidelines of the Canadian National Instrument 43-101 and is based primarily on proximity to data with the last line of samples forming the lateral and vertical extent of the resources. Secondary considerations included slope of regression and kriging efficiency. In our opinion and considering the current price of copper we assume that a 0.25% Cu cut-off can be mined and processed economically and trust that the recently commissioned Preliminary Economic Appraisal Report will confirm this assumption. This cut-off was applied to the mineral resources presented in Table 1-1 below.

| Resource Class | Volume (xMillion m ³⁾ | Density | xMillion Tonnes | Cu(%) |
|-------------------|-------------------------------------|-------------------|--------------------|----------------|
| Measured | - | - | - | - |
| Indicated | 163.2 | 2.8 | 456.9 | 0.31 |
| M+I | 163.2 | 2.8 | 456.9 | 0.31 |
| Inferred | 122.3 | 2.8 | 342.4 | 0.29 |
| Rounding has | been applied as appl | ropriate to refle | ect limits of prec | ision and accu |

Table 1-1: Haib Resource Estimates

 Table 1-2 : Haib Copper Indicated Mineral Resources, Sensitivity Cases.

| %Cu Cut-off | Volume (xMillion m ³) | Density | xMillion Tonnes | Cu (%) |
|-------------|--------------------------------------|---------|--------------------|-----------|
| 0.20% | 323.2 | 2.8 | 904.8 | 0.27 |
| 0.25% | 163.2 | 2.8 | 456.9 | 0.31 |
| 0.30% | 78.5 | 2.8 | 219.8 | 0.36 |

 Table 1-3: Haib Copper Inferred Mineral Resources, Sensitivity Cases.

| %Cu Cut-off | Volume (xMillion m³) | Density | xMillion Tonnes | Cu (%) |
|-------------|-------------------------|---------|--------------------|-----------|
| 0.20% | 245.1 | 2.8 | 686.2 | 0.26 |
| 0.25% | 122.3 | 2.8 | 342.4 | 0.29 |
| 0.30% | 39.2 | 2.8 | 109.8 | 0.34 |

1.7 Interpretation and Conclusions

In our opinion, the Issuer is exploring a large volume porphyry copper deposit situated in an ideal location adjacent to modern infrastructure which has the potential to become a large copper producer. There already exists a significant body of technical data concerning the Haib mineralisation and the period between resource estimation, pre-feasibility and definitive feasibility studies could be relatively short.

1.8 Recommendations

DSM recently commissioned a preliminary economic assessment ("PEA") which uses the data from the recent resource estimate ⁽¹⁾ and this PEA will guide future expenditure on more detailed assessment of the project.

HM, as the operator of the Haib project has proposed to the Ministry of Mines, as motivation for renewal of the EPL, a programme of exploration over the next 18 months involving the recently completed Resource Estimation study, a Preliminary Economic Assessment study (nearing completion), a 1: 10,000 scale geological mapping exercise of outlying areas of interest, further metallurgical tests, geotechnical drillholes to aid advanced mining studies including a planned open-cast mine pit, and more detailed resource estimates and economic studies. These programmes are estimated to cost US\$ 625 000 (currently equivalent to some C\$ 800 000 or N\$8.0 million).

In my opinion this programme has real merit and it is recommended that HM proceed with the proposed programme.

2. INTRODUCTION

2.1 Scope of Work, Terms of reference and Purpose of the Report

The mandate given to P&E Walker Consultancy cc ("P&E") is to provide the Board of Directors of DSM ("The Board") with an updated independent technical review of the Haib property which incorporates the Resource Estimate ⁽¹⁾ and to comment on the efficacy of the further exploration programme proposed by HM. The report is to be used by DSM in a capital raising exercise.

This independent Technical Report has been prepared at the request, on 4th September 2017, of Mr. P. Léveillé, President and CEO of DSM. The fee for the preparation of this Report is being paid by DSM and is not dependent on the outcome of any capital raising exercise.

2.2 Principal Sources of Information

The Report was completed by P&E and relies extensively on information, materials, representations and exploration data provided by historical and more modern data records obtained from The Boards, Teck and Mr. V. Stuart-Williams, a Professional Geologist registered with the South African Council for Natural Scientific Professions, registration No.400266/87, who has been associated with the Haib Project in various technical and advisory roles for over 20 years and is currently the Technical Director of DSM. The principal author has incorporated sections from the report of Obsidian Consulting Services ("Obsidian") dated July 2017⁽¹⁾ in writing this review report and is not responsible for the results, estimates or conclusions of the Obsidian study.

This Report has undergone extensive review by The Board, their advisors and by the contributing author to ensure that the information and representations contained in the Report are current, accurate, correct and complete and that there are no material omissions of information that would affect the conclusions contained in the Report.

The Technical Report is to be read as a whole and sections or parts of it should not be read or relied upon out of context. This notice, which is an integral part of the Report, must accompany every copy of the Report.

This entire Report is subject to the scope of work conducted as well as the assumptions made and to all other sections of this Report.

The effective date of this report is 22nd December 2017. The Qualified Persons and authors of this Report and their business entities have no direct or indirect interest in the subject or any nearby mineral property and are entirely independent of DSM and its shareholders.

2.3 Site Inspections

I visited the Haib Project site described in this report on various occasions between 1989 and 1995 and on the 24th January 2012 in the company of Mr. Nuri Ceyhan, exploration manager of Teck Namibia and with Mr. Neil Grumbley, Teck's Haib Project manager and again on the 30th June 2015 with Mr. Neil

Grumbley. I am assured by the HM management that as at the date of this report no further field work or material change has occurred at the Haib project site since my June 2015 visit and that only desk-top appraisal studies as outlined in this report have been concluded since that visit.

3. RELIANCE ON OTHER EXPERTS

3.1 Other Experts

DSM requested that the principal author review the Haib Porphyry Copper Project and prepare a technical summary of the project which incorporates the findings of the recent Obsidian report on the Estimated Mineral Resources.

This report has been prepared under the guidelines of National Instrument 43-101 and is to be submitted as a Technical Report to the TSX Venture Exchange ("TSX") in support of DSM's proposed capital raising.

The principal author is reliant on the expertise of the contributing author for the results, estimates and conclusions of the Obsidian resource estimate.

3.2 Mineral Tenure

The author has reviewed the records ^(42 & 50) of the Namibian Ministry of Mines and Energy last updated on 4th December 2017 and believes that the Exclusive Prospecting Licence is in good standing; furthermore, the Issuer has provided the author with a copy of the recently renewed EPL licence document dated April 2017 and we have also obtained a legal opinion of the validity of the licence which confirms this belief (see Appendices 1, 2 & 3).

The opinion of the author regarding the validity of HM's rights to EPL 3140 as presented in this report are wholly conditional upon the accuracy and completeness of the information supplied by those references named above. The author reserves the right, but will not be obliged, to revise this report if additional information becomes known to the author subsequent to the effective date of this report.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 The Exploration Licence and HM's Rights & Obligations

In Namibia the Ministry of Mines and Energy grants an Exclusive Prospecting Licence ("EPL") in terms of section 48(4) of the Minerals (Prospecting and Mining) Act, No.33 of 1992 to an applicant under certain terms and conditions which form part of the licence documentation – see Appendices 1 & 2.

Deep South Mining (Pty) Ltd obtained EPL No. 3140 allowing for the exploration of Precious and Base Metals and Base and Rare Metal Groups of Minerals over an original area of 74 563 ha on 22nd April 2004; the area extended over the known mineralisation of the central Haib deposit and a substantial surrounding area. The EPL was renewed in 2007, 2009, 2011, 2013, 2015 and again in 2017 and is valid to 22nd April 2019. In April 2007, the extent of ground held was reduced in accordance with the renewal obligations to an area of 36 502.4ha. The Table below lists the corner co-ordinates of the reduced EPL: -

| Licence | Nr | Lat | Long |
|----------|----|--------------|-------------|
| EPL-3140 | 1 | -28.72530758 | 17.78740212 |
| EPL-3140 | 2 | -28.71183732 | 17.74992010 |
| EPL-3140 | 3 | -28.67100381 | 17.68364770 |
| EPL-3140 | 4 | -28.62124926 | 17.75614951 |
| EPL-3140 | 5 | -28.55535382 | 17.82202069 |
| EPL-3140 | 6 | -28.62443708 | 17.92656044 |
| EPL-3140 | 7 | -28.62670927 | 17.95497900 |
| EPL-3140 | 8 | -28.69475300 | 17.96558957 |
| EPL-3140 | 9 | -28.72089474 | 17.96970697 |
| EPL-3140 | 10 | -28.75324360 | 17.95375930 |
| EPL-3140 | 11 | -28.74086885 | 17.79335440 |

Table 4-1: List of corner co-ordinates in decimal degrees for EPL3140.

Details of the location are given in the Location Map, Figure 4-1, while Appendices 1 and 2 are copies of the documents granting and renewing the EPL as well as recording the transfer of rights to the EPL from Deep South Mining (Pty) Ltd to HM.

The surface rights of the property covering portions of the farms de Villierspunt 353, Tsams 360 and Withoek 387 are owned by the State. The EPL boundaries have not been surveyed or physically beaconed but the current corner

coordinates have been provided by the Namibian government in the EPL grant documents.

I am not aware of any environmental obligations or liabilities except those listed in Part 3 of the attached Appendix 1 which states: -

**8.* The holder of the exclusive prospecting licence shall observe any requirements, limitations or prohibitions on his or her prospecting operations as may, in the interests of environmental protection be imposed by the Minister from time to time.

9. The holder of the exclusive prospecting licence shall enter into an Environmental Contract with the Ministry of Environment and Tourism and that of Mines and Energy within one (1) month of the date of issue of the licence."

The Environmental Contract and clearance certificate has been concluded with the respective Ministries and we have had sight of these documents, which are dated 15 August 2017 and are valid for 3 years. We have also been provided with a copy of the Environmental Management Plan produced by SLR Consultants ⁽⁴³⁾ which was submitted in support of HM's application to the Ministries and which now forms part of the accepted commitment towards HM's environmental obligations.

I am not aware of any additional permits required in respect of exploration activities on the property apart from water abstraction permits that will need to be obtained from time to time from the Ministry of Water Affairs in order to pump water from the Orange River for drilling purposes. I have been provided with a copy of the last water abstraction permit which was valid from 28th March 2014 to the 27th March 2017 and that the only significant conditions attaching to this permit are for the installation of an approved water meter, monthly readings of the meter and payment at a tariff rate of 1.5 Namibian cents per cubic metre of water consumed.

As the subject property is State land, no access permits or contracts are required in terms of the grant of the EPL (see Appendix 1).

In order to retain title to the EPL, HM have to spend at least 80% of the committed budget for the 2017 / 2018 work programme which has been agreed with the Namibian Ministry of Mines & Energy (see also the conditions of grant as specified in Appendix 1); As at 14th December 2017, I am assured by a letter received from the Directors of HM that their current expenditure on the project will meet and possibly exceed this minimum expenditure commitment. This letter also states that all obligations and requirements in regard to compliance with licence conditions have been met and that the future obligations of HM to report progress and abide by the agreed work programme have also been noted and will be complied with within the time frames agreed with the Ministry.

4.2 Location

The Haib copper deposit is in the extreme south of Namibia close to the border with South Africa which is defined by the course of the Orange River (see Figure 4-1). The deposit lies some 12 - 15 kilometres east of the main tarred interstate highway connecting South Africa and Namibia and the nearest railway station is at Grunau, some 120km north on the main highway. This rail connection could provide access to either the port of Luderitz or to Walvis Bay via Windhoek or to South African ports or facilities via Upington.

4.3 Project Ownership

On June 20th 2008 DSM concluded a joint venture agreement with Teck, which was amended on March 9th 2009 (the "Agreement"). Teck then acted as the exploration operator and manager for HM.

The Agreement with Teck provided that Teck had the right to earn a 70% undivided interest in the Haib copper project in Namibia if it completed an agreed programme of exploration which it duly complied with; Teck has now agreed to relinquish exploration management and its 70% interest in HM and has exchanged its rights and obligations in the project for a 35% shareholding in DSM.

The exploration approach taken by Teck was to prospect for adjacent, additional mineralisation by means of remote sensing, regional geophysical and geochemical stream and soil sampling programmes and / or to increase the tonnage and / or the grade by further core drilling to explore the already identified higher-grade portions of the mineralisation since these are poorly defined by the historical vertical drilling. Teck also completed an extensive programme of quality control and data checks by means of modern surveying of the historical drillhole collars as well as resampling and assays of a large number of the RTZ drill cores. The Teck exploration programme described in this report is the result of that exploration approach.

4.4 QP Comment

I am not aware of any significant risk factors that may impede the progress of the exploration activities proposed for the property which may involve access, title or availability of contractors.





LEGEND

Location of the Main Haib mineralisation.

Figure 4-1: Location Map: The Haib deposit is situated some 12-15 kilometres east of the main tar road connecting South Africa and Namibia. Access from the tar road to site is via variable quality all-weather gravel road, the last section requiring all wheel drive. The current area of EPL 3140 is 36,502.4ha.

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

5.1 Physiography

The Haib deposit straddles the Volstruis River (meaning the Ostrich river in Afrikaans), which is a tributary of the Haib River. Both are ephemeral tributaries of the Orange River which lies south of Haib.

The Orange River is a deeply incised drainage with several nick-points. Haib lies below all of the main nick-points at a location where the Orange River elevation is approximately 200 metres above sea level. The Haib deposit lies at elevations from a floor elevation of just under 375 metres amsl to over 600 metres amsl. The surrounding area is up to about 650 metres amsl at the highest point. The area is rugged with steep sided valleys and rapid local relief.

The vegetation around the deposit is essentially xerophytic in nature with sparse semi-desert shrubs and grasses with some stunted trees (Adenolobus garipensis, Euclea pseudebenus or wild ebony³⁴ and others) along water courses.

5.2 Accessibility

Access to the Haib property is via a 10-km graded gravel road from the main interstate tarred highway to the camp site at the old Rio Tinto Zinc Corporation ("RTZ") exploration campsite. This road is accessible to conventional cars. From the campsite to the Haib copper deposit (another 5 km) is a four-wheel drive gravel track that is relatively slow but essentially all-weather. The site itself is very rugged and there is only limited access along the numerous bulldozed drill-site access roads. Access to other parts of the site is largely by foot. The topography of the site is illustrated in Photograph 1. There is an existing gravel airstrip, some 1,500m long on the property which is in unknown condition and would require inspection before light aircraft could safely make use of this facility.



Photograph 1: The photograph very clearly shows the rugged, barren nature of the area surrounding the Haib deposit. The view is looking northeast down the Volstruis River to the Haib River at the foot of the far hills. Almost all of the rocks visible in the foreground area of this photograph lie within the Main Haib deposit. The main access road can be seen running across the photograph from the photograph's bottom left hand corner. The white arrow indicates the location of the old workings in the Volstruis River and the nearby bulk sampling adit.

5.3 Infrastructure

The infrastructure in the area is good. The Haib deposit is relatively close to the main north-south tarred interstate highway between Cape Town and Windhoek so the only road construction required would be an upgrade to the existing ~12 km long access road to site. The nearest settlement is Noordoewer, some 12Km south of the Haib entrance gate, a village of some 5,000 people with only basic services and facilities.

The main north-south national power grid lines are some 85km to the east of the Haib; an 85-km link and upgrade of the line capacity would likely be required should the project be developed.

Water is currently available in large amounts from the Orange River which is about 15 kilometres by pipeline south of the main Haib deposit, however, future demand upstream may lessen the available water supply.

The nearest rail link is at Grunau station, some 120 kilometres north of the Haib. The area between the Haib and Grunau is almost completely flat and the local rail authority has confirmed that a link could be laid relatively easily; this would provide access to either the port of Luderitz or the port of Walvis Bay via Windhoek or to South Africa via Upington.

5.4 Climate

The Haib copper deposit is in the extreme south of Namibia and is unusual in that it is located on the boundary between the summer and winter rainfall areas. In summer the temperature can go as high as the mid 40° C, while in winter it can go as low as freezing point. Rainfall in winter is generally light drizzle with occasional harder falls. In summer the rainfall is associated with occasional thunder storms and is of short duration, but can be of very high intensity. All of the streams within the area are ephemeral but can flow very strongly after summer storm rainfall. Average annual rainfall is 25-50 mm. Access to the site is possible throughout the year and there should be no interruptions to mining because of inclement weather ^(6, 30).

5.5 Sufficiency of Surface Rights

Suitable and sufficient areas for tailings dams, recovery plant, waste dumps and heap leach pads are available within the EPL area but the chosen sites will be dependent on the eventual mine and plant design. The project covers portions of the farms de Villierspunt 353, Tsams 360 and Withoek 387 which are State land and currently only used for emergency stock grazing purposes under lease from the State, so mining should not conflict with any formal farming activities.

6. HISTORY

6.1 Sources of Historical Exploration Data

The author draws his knowledge for this section from the Behre Dolbear ⁽²⁾ report; from the Namibian Copper Mines report ⁽³⁾, from the South African Committee for Stratigraphy (SACS) ⁽⁴⁾ and from the Gordon / McIlwraith report ⁽⁵⁾, and from personal knowledge. The author has only seen extracts of reports and third-party reports on the early mining at Haib and information referred to is gained from these reports and discussions with the late Mr. George Swanson (see below).

6.2 Early Mining

The Haib deposit has a distinct surface expression with abundant copper staining on fractures and joint planes, particularly in and around the dry river bed of the Volstruis River (see Photographs 1 & 2). This led to German prospectors identifying the deposit around the late 1800s or early 1900s. Small tonnages of high grade copper carbonate ore were mined at this time. Incidentally, the word Haib is probably derived from the local Nama language although the Haib Pforte (fort) is shown on the original German military maps of German South West Africa, dating from about 1907. The fort appears to have been a place rather than a structure and the location on the ground is unknown.

After World War II, the prospect was pegged as claims by prospector Mr. George Swanson who carried out small scale mining and tank leaching operations. Over 6,000 tonnes of hand sorted high-grade copper ore were sold to the O'okiep Copper Mines, across the border at Nababeep in South Africa, reportedly at grades of up to 18% Copper. Lower grade copper carbonate ore was leached with acid. The acid was then run over iron scrap and the copper precipitated as "copper cement". This copper cement was sold to the smelter at the O'okiep Copper Company for further refining. Swanson only worked these claims when the copper price was high enough to justify the process (personal communication).

6.3 Post-1960 Exploration ^(2, 5,7)

In 1963 and 1964 Falconbridge of Africa (Pty) Ltd ("Falconbridge") completed an exploration programme focused on the higher-grade zones within the Haib deposit. They drilled some eleven diamond drillholes totalling 1,012 metres of drilling. The average grade of the drillhole intersections was given as 0.33% Cu. In 1964 Falconbridge allowed their rights to lapse; very little of their data remains on record.

During 1968 and 1969 King Resources of South Africa Pty Ltd ("KRC") conducted a further diamond drilling programme of 21 holes totalling 3,485 metres. They examined both lower and higher-grade sulphide zones, as well as the higher-grade oxide shear zones. Some leach test work was carried out. The area was abandoned in 1969. Again, very little useful data survives from this programme.

During 1972 to 1975 Rio Tinto Zinc ("RTZ") conducted the first extensive and systematic investigation of the Haib deposit. Geochemical and chip sampling surveys were conducted along with IP and Resistivity surveys. They drilled one hundred and twenty diamond drillholes (120) totalled 45,903 metres, one section was partially drilled at 25 metres spacing to provide detailed information on close spaced variability (see Figure 6-1 below); the core from this programme is still intact and stored in a core shed on site (see photograph 3 & 4 below), although much of the mineralised sections are now reduced to quarter core. RTZ sampled by compositing half cores over 2 metre intervals and submitted these for determination of total copper and where appropriate, oxide copper (acid soluble copper). Composite samples from each drillhole were also tested metallurgically to determine recoverable copper and were assayed for molybdenum, silver and gold indicating average contents of 25 g/t Mo, 0.01 g/t Au, and 0.9 g/t Ag. Tonnage and grade estimates at various cut-offs were made and a conceptual pit design was proposed.

In 1991 and 1992 Revere Resources SA Ltd, produced a technical brochure and promoted the Haib as a "potential world class copper producer for the 1990s". It would appear that the intent was to list the company, possibly on the Johannesburg Stock Exchange, using the Haib as a property of merit. For reasons unknown to me this listing never materialised. No exploration work was done.

In November 1993 Rand Merchant Bank Ltd (of South Africa) ("RMB") acquired an option over the Haib property. Venmyn Rand Pty Ltd., mining management consultants to RMB then undertook a study of the project including compilation of all the available drillhole and assay records from previous investigations and set up a computerised drillhole database. It was concluded that the increase in the copper price since the 1970's, development of low cost / high tonnage mining systems and new and refined technologies such as bacterial leaching, solvent extraction and electro-winning combined to create a situation where development of the Haib deposit could represent an economic project; however, no further exploration work was done and work terminated in 1995.

In March 1995, Great Fitzroy Mines NL ("GFM") and RMB executed an Agreement in association with claim owner Mr. George Swanson to acquire 100% of the Haib project. GFM agreed terms with RMB whereby GFM could earn 90% of the project. Subsequently GFM agreed to transfer a 70% interest in the deposit to Namibian Copper Mines Inc. ("NCM") in exchange for NCM reimbursing past expenditure and providing GFM with a free 20% carried interest. NCM then purchased the remaining RMB interest leaving GFM with a 20% free carried interest and the management and NCM holding 80%⁽²⁾. The operating company was called the Namibian Copper Joint Venture ("NCJV"). From 1995-99 the NCJV prospected the Haib managed by GFM. The names NCJV and GFM can be read as being synonymous.

Apart from the central mineralised core of the deposit which was covered by the Swanson claims and held under option by NCJV, the mineral rights over the greater Haib area were held by Copper Mines of Southern Africa (Pty) Ltd ("CMSA") as EPL 2152 and worked by the NCJV.

From 1995 to 1999 the NCJV drilled a further 12 infill holes, drilled 5 geotechnical investigation holes, completed 126 metres of excavation in an adit and two crosscuts for bulk sampling and metallurgical testing and carried out various test works including mining cost audits, bio-leaching studies, and milling and grinding studies. In February 1997 a Feasibility Study – Phase 2 Report was produced by their mining consultants, the Minproc – Davy Joint Venture ⁽¹⁷⁾. The NCJV ran into financial difficulties and work was stopped at the Haib deposit in late 1998 to early 1999.

Rusina Mining Ltd of Perth, Australia acquired the concession from GFM / NCJV during 1999-2000 and they took over ownership of the Haib data. The transfer of the mineral rights to Rusina was apparently not ratified by the Namibian Government and no work was done by this company.

In 2003 (date uncertain) in response to the Namibian government enforcing the new Namibian Minerals Act, claim owner Mr. George Swanson, who throughout much of the Haib dealings had held some 69×18 hectare claims over the core area of the Haib deposit, was forced to finally relinquish his Haib claims as he had not prospected or mined the claims for some years. This meant that the property was free and 100% of the mineral rights were vested in the Namibian Government.

This allowed DSM to consolidate a single mineral rights entity over the entire Haib deposit. An initial Exclusive Prospecting licence 3140 was granted for 3 years from 22 April 2004 to 21 April 2007 over an area of 74,563.0 ha covering the deposit and a very large surrounding area. This was subsequently renewed in April 2007, 2009, 2011, 2013, 2015 and 2017 with the area reduced to 36,502.4ha after the 2007 renewal. The current EPL and details of its location are shown in Appendices 1 & 2.



Photograph 2:

This photograph is taken in the bed of the Volstruis River looking approximately southwest at the portal of the bulk sampling adit.



Photograph 3: View of the RTZ core shed in the background and the Teck drill core stacked in the foreground in metal boxes.



Photograph 4:

View of the RTZ core – split for assay and well preserved in wood & metal core trays.



Figure 6-1: Proposed Mining Pit Layout: This is a reduction of a GFM map dated about 1996. The map shows the proposed 2-year, 8-year and 22- year pits generated from their geological model. The small black numbers indicate drillholes from the Rio Tinto and earlier drilling programmes. The larger blue numbers indicate drillholes that the NCJV / GFM proposed for drilling (June 1996). These drillholes were only drilled after the BD resource estimates were completed.

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa

From 2008, Teck under the option Agreement with DSM had completed a comprehensive exploration programme at the Haib and immediate surroundings and it is the results of this programme that have justified the further studies incorporated in this report. DSM, through their wholly owned subsidiary, HM intend to continue to invest in an on-going exploration and development programme.

6.4 Historical Estimates

The tonnage and grade estimates quoted below are historic mineral estimates, that is to say they were prepared prior to DSM and subsequently, HM acquiring their interest in the Haib property. The estimates quoted here are therefore Historical Estimates as per the NI 43-101 Rules and Policies Part 1 definition of Historical Exploration Information.

I have not done sufficient work on the drill assay database nor have I had access to RTZ assay certificates or QA / QC data to classify the historical estimates as current mineral resources and neither Teck, DSM, HM or the Issuer are treating the historical estimates as current mineral resources or mineral reserves.

Four sets of historical estimates were prepared in the past by different authors. These will each be examined in turn. They are relevant in that they show the thinking of the investigators at that time and also provide insight into the areal extent and expected tenor of mineralisation.

6.4.1 RTZ Historical Estimate

Somewhere around 1975, RTZ, using the sample results from the 120 drillholes drilled by them (and perhaps the earlier drilling as well?), calculated an estimate of tonnage and grade for the Haib deposit. The figures reported suggest a very large volume of contained copper amounting to over 2 million tonnes of metal at a fairly low average grade of 0.27% Cu. RTZ used various cut-offs, but it is not reported what method of determination they used. The figures were considered by RTZ to be an Indicated Resource; however, they should be viewed as an Historical Estimate only (see Table 6-1)

| Table 6-1: RTZ - Haib Historical Estimate | | | | | | |
|---|-----------------|--------------|------------------|--|--|--|
| Cut-Off (% Cu) | Tonnage (Mt) | Grade (% Cu) | Contained Cu (t) | | | |
| 0.15 | 831 | 0.27 | 2,244,000 | | | |
| 0.20 | 563 | 0.32 | 1,802,000 | | | |
| 0.25 | 374 | 0.37 | 1,384,000 | | | |

(Note: This is a Historical Estimate; a qualified person has not done sufficient work to classify this historical estimate as current mineral resources or mineral reserves and the Issuer is not treating them as current mineral resources or mineral reserves) Interestingly, RTZ seems to have concentrated on higher tonnages and not on the higher-grade zones. There is no evidence that they attempted estimates at any higher-grade cut-offs (such as 0.3% Cu). Clearly RTZ was interested in developing large volume mining resources.

6.4.2 Venmyn Rand Historical Estimate

In 1993 Venmyn Rand Pty Ltd prepared an information memorandum on the Haib deposit and estimated an in-pit "reserve" using a computer model, although the exact methodology is unknown. They generated the historical estimate presented in Table 6-2 below.

| Table 6-2: Venmyn Rand – Haib Historical Estimate | | | | | |
|---|-----|-----|-----------|--|--|
| Cut-Off (% Cu)Tonnage (Mt)Grade (% Cu)Contained Cu (t) | | | | | |
| 0.3 | 400 | 0.4 | 1,600,000 | | |

(Note: This is a Historical Estimate; a qualified person has not done sufficient work to classify this historical estimate as current mineral resources or mineral reserves and the Issuer is not treating them as current mineral resources or mineral reserves).

The pit design used by Venmyn Rand was essentially conceptual and very large, being well beyond subsequent pit boundary designs. The Venmyn Rand estimate is thus considered to be effectively a global Historical Estimate above the 0.3% Cu cut-off.

6.4.3 NCJV / GFM Historical Estimate ⁽³⁾ (1996)

The NCJV used the Venmyn Rand computer database and recalculated their estimate around a more realistic geological and pit model. The pit model was designed to provide some 22 years of mineable material within a 2-year and 8-year mining pit plan. Geostatistical block modelling was carried out and tonnage and grades reported at a range of cut-offs within the various pit outlines. All drillhole assay results were composited over 7.5 metre down-hole intervals prior to variography and block kriging; the pit outlines were used to constrain the reporting of the block tonnes and grade which were thus reported as resource tonnages within a specified pit. The estimates were made in August 1996 and considered by GFM to be Indicated Resources although this category was chosen "...in accordance with accepted mineral industry practices" at that time.

The in-pit Historical Estimates as determined by GFM in 1996 (and approved by BD) based on the drilling to the end of 1975 are tabulated below in Table 6-3. Figure 6-1 above shows the proposed GFM two-year, eight-year and twenty-year pit outlines.

| Table 6-3: GFM - Haib In-Pit Historical Estimate – June 1996 | | | | | | | | | | | | | |
|--|-----------------|------|--------------|------|---------|-------|-------|--|--|--|--|--|--|
| Pit | Cut-Off 0.3% Cu | | 0.1%-0.3% Cu | | Cut-Off | Waste | | | | | | | |
| | Mt | % Cu | Mt | % Cu | Mt | % Cu | Mt | | | | | | |
| Year 2 | 21.4 | 0.39 | 27.9 | 0.20 | 49.1 | 0.28 | 2.1 | | | | | | |
| Year 8 | 73.4 | 0.36 | 289.2 | 0.20 | 362.4 | 0.23 | 21.8 | | | | | | |
| Year 22 | 135.5 | 0.38 | 803.4 | 0.19 | 939.1 | 0.22 | 95.7 | | | | | | |
| Total | 230.2 | 0.37 | 1120.5 | 0.19 | 1350.7 | 0.22 | 119.5 | | | | | | |

(Note: This is a Historical Estimate; a qualified person has not done sufficient work to classify this historical estimate as current mineral resources or mineral reserves and the Issuer is not treating them as current mineral resources or mineral reserves)

6.4.4 Behre Dolbear Historical Estimate⁽²⁾

Behre Dolbear ("BD") viewed the Haib deposits as resources not reserves, because at the time of assessment they could not be demonstrated to be economic since no feasibility study had been completed. Therefore, BD undertook, after discussion with GFM, to review potentially mineable resources after the additional work had been completed, all or part of which could then be upgraded to a reserve status. This work was never completed. BD did not independently check the accuracy of the data provided by GFM but accepted the data as supplied for this work.

The drillhole data set provided to BD consisted of assay and survey data from 152 drillholes. The location of the drillholes was based on a local coordinate system. Included in the assay database were primarily the copper assays.

The historical mineral models generated by BD were estimated by generating three separate three–dimensional block models using nearest neighbour, inverse distance squared and kriging estimation techniques. Their results are compared with the GFM estimate in Table 6-4 below: -

| Table 6-4: Haib Historical Estimate - Behre Dolbear / GSM | | | | | | | | | | | | | |
|---|-----------|-------|-----------------------|-------|-----------------------------|-------|----------------------|-------|--|--|--|--|--|
| Minimum Block Grade | GFM Model | | Behre Dolbear's Model | | | | | | | | | | |
| | | | Kriging | | Inverse Distance Squared | | Nearest Neighbour | | | | | | |
| | М | Grade | М | Grade | М | Grade | М | Grade | | | | | |
| | Tonnes | % Cu | Tonnes | % Cu | Tonnes | % Cu | Tonnes | % Cu | | | | | |
| 0.1 | 1350 | 0.23 | 1353 | 0.23 | 1331 | 0.23 | 1184 | 0.25 | | | | | |
| 0.2 | 730 | 0.28 | 739 | 0.29 | 726 | 0.29 | 630 | 0.34 | | | | | |
| 0.3 | 230 | 0.37 | 244 | 0.37 | 262 | 0.38 | 292 | 0.46 | | | | | |

(Note: This is a Historical Estimate; a qualified person has not done sufficient work to classify this historical estimate as current mineral resources or mineral reserves and the Issuer is not treating them as current mineral resources or mineral reserves)

6.5 QP's Comments on the Various Models and Estimates

Both the GFM model and one of the BD models used Kriging methods as the basis for their estimate calculations. The figures generated are very comparable, the BD numbers being very slightly more generous in both grade and tonnes. Kriging as a statistical estimation technique is widely used in porphyry deposits.

When calculating block values with the inverse distance model, the arithmetic process decreases grade on an inverse basis away from the point of measurement. In simple terms this means that the grade initially decreases rapidly away from the data source then flattens off with distance. Parameters for the X, Y and Z axes are operator chosen and can be varied in different directions in the event of mineralisation being obviously controlled by any geological factor, such as faulting, unconformity contact or bedding.

The Haib deposit is not bedded, although some structural control over higher grade mineralisation is apparent, and has a fairly uniform grade distribution.

The nearest neighbour technique assigns the grade of the sample nearest the centre of the block to the block and provides a global check on the estimates.

It should also be noted from comments made elsewhere in this report during discussions of the recent Teck drilling that the historical, vertical drilling used for all of the above historical estimates may have incorrectly estimated both the extent and the grade of the high-grade zones because the high-grade zones lie within a dipping set of fractures and require inclined drillholes to obtain a true thickness estimate.

The most significant and well documented historical mineral estimate derives from the report by Behre-Dolbear ⁽²⁾ (1996) that was commissioned near the end of the NCJV tenure at the Haib and is summarized in Table 6-4 above. Please note: -

(1) That this estimate was prepared prior to publication of the National Instrument 43-101 guidelines and the CIM definitions and Standards for reporting of

mineral reserves and resources in 2000 and their subsequent amendments in 2005, 2010 & 2014, and perhaps more importantly,

(2) The Historical Estimates developed by Behre Dolbear (1996) for the Haib deposit have been reviewed here by the author; however, the underlying data and evidence, particularly assay certificates, required for the author to validate and classify these Historical Estimates as current mineral resources are not available. Therefore, the historical grades and resources terminology from the historical original reports are to be used only as a reference and are to be considered as Historical Estimates as per the NI 43-101 Rules and Policies Part 1 definition of Historical Exploration Information. Neither DSM nor HM are treating the historical estimate as a current mineral resource or mineral reserve and do not rely on this estimate in any financial studies.

7. GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology (37)

The Haib deposit is located within part of the Namaqua-Natal Province called the Richtersveld geological sub-province which is further subdivided into a volcanosedimentary sequence (locally, the Haib Subgroup), the Orange River Group and the intrusive Vioolsdrift suite which are closely related in space and time (Figures 7-1, 7-2 and 7-3 below). The Orange River Group is composed of sub-aerial volcanic rocks and reworked volcaniclastic sediments; deformation caused displacements along stratigraphic contacts before intrusion of the Vioolsdrift suite. The predominance of andesitic and calc-alkaline magmatic rocks with tectonic compression prevailing throughout the magmatic episode has led to an interpretation of an island-arc model for the region. Recent age dating of Haib rocks by separation of zircon and apatite on which laser ablation and inductively coupled plasma mass spectrography was used to derive the U/Pb ratios was performed at Trinity College, Dublin by Neil Grumbley and indicated an age of 1,880 Ma for the volcanics.⁽⁴⁷⁾

The principal mineralised hosts at the Haib are a Quartz Feldspar Porphyry (QFP) and a Feldspar Porphyry (FP) – see Figures 7-2 and 7-3 below. The QFP is interpreted as a quartz diorite body which intruded the feldspar porphyry some 1,868 ± 7Ma ⁽⁴⁷⁾. The FP is generally interpreted as being part of the suite of andesitic rocks although some workers have suggested that it too, may be partially of intrusive origin. The QFP is elongated along the orientation of the Volstruis Valley, largely coincident with the location and orientation of many of the higher-grade intersections within the deposit.

The sequence has undergone low grade regional metamorphism to greenschist facies which event has been dated at 1,100Ma ⁽⁴⁷⁾. Most of the rock exhibits typical porphyry copper type alteration zones associated with mineralisation. A potassic hydrothermal alteration zone coincides with the main mineralised area surrounded by phyllic and propylitic alteration haloes. Propylitic and sericitic alteration appears to overprint the earlier potassic zones. Silicification, sericitisation, chloritisation and epidotisation are widespread.

Although not present in the immediate area of the Haib deposit, some kilometres to the west of the area are outcrops of Karoo age ⁽⁴⁾ (early Permian) mudstones, siltstones and sandstones of the Prince Albert Formation. These create very flat topography.



Figure 7-1: Regional Geology: Map showing the general distribution of the Vioolsdrift and Orange River rocks in relation to the Haib deposit. (Source: Teck Namibia ⁽⁴⁵⁾, 2015).

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Figure 7-2: Local Geology: Geology of Haib (from Teck 2015 (45))



Figure 7-3: Intrusive Rocks: This map shows the detailed intrusive rock units of the Haib deposit. (Source: Teck 2015 ⁽⁴⁵⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa


Figure 7-4: Regional Tectonic Map: Tectonic sub-division of the Namaqua sector of the Namaqua-Natal Province, as sourced from the Geology of South Africa, pg.326⁽³⁷⁾.

BoSZ: Boven Rugzeer Shear Zone, BSZ: Brakbosch Shear Zone, DT: Dabep Thrust, GT: Groothoek Thrust, HRT: Hartebees River Thrust, NSZ: Neusberg Shear Zone, PSZ: Pofadder Shear Zone.



Figure 7-5: Local Tectonic Map: The three main structures recognised at Haib: 1) The Northern Shear Zone truncates porphyry mineralisation to the north, with reverse of movement; 2) the East-West Fault has normal movement down dropping mineralisation by >100m to the north; 3) the North-South Quartz Vein has normal movement, down dropping mineralisation by >100m to the SE. There are also numerous other smaller faults and shears with 1-5m displacement (Teck 2015 ⁽⁴⁶⁾).

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa

7.2 Local Geology of the Haib Deposit (19, 20, 23, 45, 46)

The QFP comprise typically blue quartz and feldspar phenocrysts within a medium grained rock mass of quartz, feldspar, sericite, biotite, chlorite, epidote and calcite. The FP is generally a medium to fine grained rock of similar composition but without the quartz phenocrysts and with a higher proportion of chlorite and epidote; please note that the sericite, epidote, chlorite and calcite are alteration products and not the original igneous composition of the QFP or the FP (Figures 7-2 and 7-3 above). Minor basic dykes and quartz veins traverse the area.

Rocks within the Haib area are hard and competent but generally well jointed with both flat and steeply dipping joint sets being well developed. Striking east-west along the Volstruis River is a well-developed zone of steeply dipping shears. The orientation and location of the main mineralisation coincides with the fracture zone which is interpreted as fractures providing a focus of the intrusion and then channel-ways for late-stage mineralising fluids. The fracture zones likely represent the local stress regime at the time of porphyry formation and control the orientation of high grade zones, and were later re-activated by the Namaqua deformation event circa 1,100 Ma ago (Figure 7-5 above).

7.2.1 Structural Controls on Copper Mineralisation (45)

Mineralisation at Haib is typical of a porphyry copper deposit and despite the age of the deposit, and the fact that the mineralisation has been subjected to local postmineral deformation, the deposit remains relatively intact. Detailed mapping by Teck geologists within the main deposit area has shown that high-grade copper mineralisation is controlled by a fracture/vein set that parallels a regional structural trend and strikes N60^oW and dips steeply (-70^o) to the southwest. This high-grade zone also appears to plunge at 30^o to 40^o towards the south-east (see Figures 7-5 above and 7-6 below). This model has significant economic implications as it suggests that the higher-grade zone of copper mineralisation has not been adequately tested by the historical vertical drillholes and that inclined drillholes will better define the extent and tenor of this mineralised zone. If this model is correct then systematic inclined drilling could better define the high-grade sections leading to better pit design to exploit near-surface high-grade mineralisation at the start of mining operations.

Teck has also defined four new target areas near to the main deposit and three other target areas on the property, namely the SW alteration feature, the NW IP anomaly and the E alteration feature that are, as yet, poorly defined (Figure 7-7 below). The well-defined targets, referred to as the eastern, southern, south-western and western anomalies, have been defined using geological mapping, stream and soil sample geochemistry and geophysical surveys using IP with several diamond drillholes in three anomalies (east, south and west) to determine the extent and tenor of mineralisation.



Figure 7-6: North-south cross-section across the western end of Haib, showing steeply south dipping Quartz Breccia Porphyry ("QBP") dykes and hydrothermal breccias (blue and brown) intruding the country rocks (QFP, QFP2 and FP), and truncated by a shear zone in the north and fault in the centre. Potassic Early Dark Micaceous veins are developed mainly in the wall rocks to breccias, particularly to the south. (Teck 2015⁽⁴⁶⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa



Figure 7-7: Location Map of Exploration Targets: This map shows the main Haib deposit (outlined in solid white at the centre of the coloured area) and the more important anomalies against Hymap Alteration Imagery: - red colours generally correspond to sericite, green to chlorite/volcanics, reddish-brown to Vioolsdrift granodiorite, and blue to Karoo and recent sand cover. (Teck 2015⁽⁴⁷⁾).

7.3 The Haib Mineralisation Model (7, 19, 45, 46)

The Haib deposit comprises a large volume of rock containing low-grade copper mineralisation with some accessory molybdenite. At surface, the copper grade varies between three higher grade core zones progressively reducing in grade outwards towards the margin of the deposit. A similar distribution persists below surface in the 300m - 400m levels explored by RTZ, although the recent deep inclined drilling by Teck to 800m depth suggests that the higher-grade zones of mineralisation exist below 400m depth. The surface area in which mineralisation has been identified equates to a surface dimension of about 2,200 x 1,250 metres. The deposit is still partially open to the west (at surface), to the south, and also at depth.

Mineralisation is spatially associated with syn-mineral porphyritic dykes (the QBP) and associated hydrothermal breccias, but there is also considerable vein and disseminated mineralisation in the QFP and FP wall rocks. Molybdenum bearing quartz veins cut both breccia and wall rocks in the high-grade zones. Teck, using very detailed geological mapping techniques, have identified a fore-arc system that strikes E-W, with late-stage oblique fracturing striking N60^oW and dipping 70^o towards the south-west. These fractures are utilized by numerous generations of quartz and Early Dark Micaceous ("EDM") veins accompanied by biotite flooding and increased grades of copper mineralisation. The EDM veins are fractures along which the earliest hydrothermal fluids flowed and are mainly composed of macroscopic biotite-ksparchalcopyrite \pm pyrite, and are typical of porphyry deposits. The sets of EDM veins are parallel to the breccias and dykes and contribute to a high-grade section plunging 30^o to 40^o to the east-south-east.

The principal sulphides within the Haib body are pyrite and chalcopyrite with minor molybdenite. Bornite, digenite, chalcocite and covellite are also present locally. There is sulphide zonation where a deep bornite-chalcopyrite assemblage grades outward and upwards to chalcopyrite-pyrite, with a low-grade pyrite \pm chalcopyrite fringing zone. There is no major development of a supergene zone, probably due to the high rates of erosion associated with the lower Orange River canyons.

Near-surface oxidation has led to the formation of malachite, azurite, chrysocolla, minor cuprite and chalcocite, generally along fracture zones. Oxide copper rarely extends to depths in excess of 30 metres on these fracture zones. While the oxide zone volumetrically represents a fairly minor proportion of the deposit, grades are significantly above average giving the potential for some leachable copper from the oxide material. These portions of the deposit have not been explored in detail.

In addition, there is a variable thickness of transition zone mineralisation generated over large parts of the deposit, between the surface oxide zone and a pure sulphide (un-oxidised) zone of some 10-20 metres thickness (i.e. completely fresh rock is encountered 30-40m below surface).

Sulphide minerals are disseminated within the rock mass and are also found concentrated in blebs and along veinlets and fractures. Significant mineralisation commonly occurs along quartz veins and in EDM veins.

Gold, silver and molybdenum are trace constituents associated with the copper mineralisation. Molybdenite is occasionally seen as disseminated flakes and in EDM veins, but the majority is hosted within a distinct generation of quartz-molybdenite veins. Assaying for gold, silver and molybdenum was not routinely conducted on drill The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa 42

samples by RTZ but was done later by NCJV on composite samples of their core and some of the RTZ core in their preparatory studies for metallurgical testing, giving an approximate indication of the likely values. HM routinely included determinations of gold, silver and molybdenum in their core drilling and have also re-assayed mineralised sections of 14 RTZ drillholes for these elements (see discussion on this programme under Section 10 below) with results being similar to the NCJV values quoted above.

Outside of the main Haib deposit HM have outlined three satellite targets (see Figure 7-7 above) called the East, West, and South anomalies which have been drilled and evaluated (see Section 9.4 below) as well as four further anomalies – the Southwest alteration feature and Southwest sericite anomaly, the Eastern alteration feature and the North-west IP feature which still require further exploration.

8. DEPOSIT TYPE

The Haib copper deposit is a porphyry copper deposit of palaeo-Proterozoic age ^(19, 47, 52). Porphyry copper deposits are a major world source of copper (also molybdenum, silver and gold) with the best-known examples being concentrated around the Pacific Rim, in North America, South America, and areas such as the Philippines. Most of these deposits are relatively young, of Tertiary or Cretaceous age. The United States Geological Survey ⁽⁵²⁾ defines a porphyry copper deposit as follows –

- "One wherein copper-bearing sulphides are localized in a network of fracturecontrolled stockwork veinlets and as disseminated grains in the adjacent altered rock matrix;
- Alteration and ore mineralization at 1–4-km depth is genetically related to magma reservoirs emplaced into the shallow crust (6–8+ km), predominantly intermediate to silicic in composition, in magmatic arcs above subduction zones;
- Intrusive rock complexes that are emplaced immediately before porphyry deposit formation and that host the deposits are predominantly in the form of upright-vertical cylindrical stocks and(or) complexes of dikes;
- Zones of phyllic-argillic and marginal propylitic alteration overlap or surround a potassic alteration assemblage; and,
- Copper may also be introduced during overprinting phyllic-argillic alteration events"

The Haib deposit has all of the above defined geological characteristics (see Section 7 above) and is therefore a porphyry copper deposit, being formed within intrusive Proterozoic rocks at 1 880my BP. Porphyry copper systems usually occur along subducted zones and commonly occur in clusters. It is interesting to note therefore, that:- The Lorelei Deposit, some 120km WNW of the Haib (Figure 7-4), is another low grade copper-molybdenum porphyry showing similar alteration zonation and is of a similar age to the Haib (^{38, 52)} and the Tatasberg deposit, some 80 km WNW of the Haib across the border in South Africa (Figure 7-4) is reportedly also a porphyry style Cu-Mo deposit showing typical alteration zoning but is reported to be only some 540my old, although the source of this dating is not reliable; the deposit was explored between 1974 & 1976 by African Selection Trust Exploration ("ASTE") and some 9 diamond drillholes were completed with the best intersection yielding 6% Cu and 32% Mo over a 1m interval but the general average is reportedly some 0.2% Cu ⁽⁴⁸⁾. Unfortunately, the detailed reports of ASTE's exploration could not be obtained from the S.A. Geological Survey as they are apparently "lost" in their library.

9. EXPLORATION

In April 2004 Deep South Mining (Pty) Ltd acquired the Haib area under EPL 3140. Subsequently, ownership of EPL 3140 was transferred to HM and Teck, as discussed previously in the Background Sections of this Report, optioned the property and assumed management of the exploration programme.

9.1 The Teck Exploration Programme

Teck took a more regional view of the project than previous operators and did not only focus on the work completed by the NCJV. Their exploration objective was to provide the required data to show that the deposit had potential for large-scale mining, particularly if the tonnage or grade, or both, could be improved and that early stage mining could exploit sufficient high-grade mineralisation to improve the economics of mining. They started a new exploration programme both to investigate the open-ended parts of the deposit (deep drilling and extension drilling) and to explore for new, undiscovered outlying mineralisation. This had not been previously attempted.

Teck, following this model, from 2008 to date, have completed the following work: -

- A regional stream sediment sampling programme collected 276 samples aiming to sample all first and second-order streams every 300m-500m over an area of 320sq.km. This was conducted in 2008 over outlying areas of alteration around the existing Haib deposit. This led to the discovery of four adjacent anomalous zones spaced some 2km from the main Haib mineralisation and it is these anomalous zones that have been geophysically investigated as discussed in later sections. Three of these zones (shown in Figure 7-7 above) have recently been evaluated by diamond drilling and found to be of low grade and caused by distal veining from some unknown porphyry intrusive.
- A total of 32 diamond drillholes (totalling 14,252 metres). These were drilled within the historically defined main mineralisation and on the Eastern, Southern and Western IP / soil geochemical anomalies (discussed in Sections 9.4 & 10.2 below).
- Using the Anaconda mapping method, which maps in detail the lithology, alteration, vein type, orientation and intensity on separate overlays, they have mapped about 75% (205 ha) of the area around the 275 ha. main deposit (at a scale of 1:10,000) and all (90 ha.) of the main deposit at 1: 2,000 scales; Teck have also mapped the Eastern and Southern IP defined anomalies at 1: 10,000 scales, while the vein zone at Haib West has been mapped at 1: 2,000 scales (Locations are shown in Figure 7-7 above).
- They have re-logged all of the available (108 out of 120) old RTZ drillholes in detail, again using the Anaconda method. These were all located within the Main Haib deposit.
- They have re-sampled 14 of the old RTZ drillholes to compare the assay results obtained by RTZ for copper and also to determine the grade of gold, silver and molybdenum (Figure 10-2 below).

• They completed some 83-line kms. of pole-dipole Reconnaissance Induced Polarization (RIP); and another 6-line kms. of Audio Magnetotellurics (AMT).

(Note: - AMT is a high-frequency magneto-telluric technique for shallower investigations. While AMT has less depth penetration than MT, AMT measurements often take only about one hour to perform, although deep AMT measurements during low-signal strength periods may take up to 24 hours, and use smaller and lighter magnetic sensors.)

- They collected 636 soil samples on grid lines 150m apart with sample spacing of 50m covering an area of 400 hectare across three of the satellite targets the South, Southwest and West anomalies (Location Figure 7-7 above).
- They constructed a 3-D geological model of the Main Haib zone using Leapfrog geo-modeling software (see Figure 9-1 below). This model combines all the surface and down hole geology, assays and geochemistry to constrain the grade envelope for a resource estimate.

9.2 Teck's Geophysics

Various geophysical techniques have been applied over the Haib deposit on several occasions. The earliest documented geophysics for which records exist was an Electromagnetic survey (EM) conducted by J. Shepherd of Falconbridge in March 1964.

A further significantly more detailed IP and resistivity survey was conducted by RTZ in December/ January 1974-75. This covered the bulk of the main mineralised area.

Teck proceeded to complete RIP, PDP and AMT geophysical surveys initially over the main Haib mineralisation and then extended their surveys to cover targets generated by a study of alteration patterns in the Proterozoic country rocks in EPL 3140. These programmes were conducted in-house. Figure 9-2 below shows the location of RIP sections completed across the main Haib mineralised zone with a 3D representation showing the Haib drilling. The impact of the disseminated sulphides in the main Haib body is well represented by the zones of red and pink (high chargeability).

The fairly extensive geophysical survey programme over alteration anomalies around the main Haib mineralised body determined several additional zones of high chargeability. These geophysical anomalies, together with detailed geological mapping to show alteration and geochemical soil, stream and rock chip sampling results allowed Teck to prioritise follow-up evaluation programmes of these anomalies which are on-going (for their location see Figure 7-7 above).



Figure 9-1: *Three Dimensional Models*: A compilation of 3-D models of the Main Haib deposit (Source: Teck, 2015)



Figure 9-2: A 3-D diagrammatic representation of the Teck IP geophysical section lines across the main Haib deposit. The pink and red zones adjacent to the drillholes show the zone of mineralisation with a high chargeability. (Source Teck 2012)

9.3 Teck's Geochemical Surveys

9.3.1 Stream sampling

This sampling campaign was aimed at evaluating the outlying areas of the licence and none of the main Haib mineralisation area was sampled by Teck. The sampling was completed in 2008 and all the large third-order streams were avoided since these would be much diluted. First and second-order streams were sampled every 300m to 500m by collecting roughly 1-2Kg of sample from trap sites using a stainless-steel shovel, dry sieving these to -2mm and further to -80# size using stainless steel sieves (brushing the sieves between samples and washing them every day) and packaging these in a brown paper sample bag with a sample number tag inside and outside of the bag. The GPS location was taken and recorded. Every 20th sample is duplicated by taking another sample within 1 or 2 metres of the first site. Standard and Blank samples are inserted later on a 1:20 frequency but randomly inserted in the sampling sequence.

9.3.2 Soil Sampling

Since RTZ soil sampling coverage around the main Haib body was quite extensive, Teck have extended their grid lines into the outer regions of the licence using the same orientation. The samples were collected on 150m line spacing using 50m sample spacing. This campaign has collected 636 samples over an area of 400 hectare. The procedure employed is to dig a hole to a depth of some 10cm. using a stainless-steel shovel, dry sieving these to -2mm and then -80# size using stainless steel sieves (brushing the sieves between samples and washing them every day) and packaging these in a brown paper sample bag with a sample number tag inside and outside of the bag. The GPS location is taken and recorded. Every 20th sample is duplicated by taking another sample within 1 or 2 metres of the first site. Standard and Blank samples are inserted later on a 1:20 frequency but randomly inserted in the sampling sequence.

9.4 Teck's Geological Mapping

Teck use a geological mapping method which results in at least 3-overlays for mapping of structural, lithological and alteration features. The more detailed mapping in and around highly mineralised areas add another "vein" overlay to this map. The various features are colour coded.

9.5 Teck's Other Targets

Outside of the main Haib deposit Teck outlined three satellite targets, as indicated on Figure 9 above. The eastern anomaly, with extensive sericite alteration zones, high molybdenum geochemical results and a defined IP anomaly, has been evaluated by four vertical diamond drillholes with a total depth of 1,525.35m (see Table 8 below) with only minor traces of mineralisation.

The southern anomaly (Figures 7-7 above and 9-3, 9-4 below) is also well defined by extensive sericite alteration, some copper staining with haematite/limonite and gypsum associated with quartz vein sets, so-called D-veins in porphyry system

terminology (photograph 5 below) and a distinctive IP response. On surface this anomaly extends over 1.2km along strike and 350m – 500m across strike; it appears to be steeply dipping to the south. Four diamond drillholes totalling 1,484.34m of which 3 holes were angled to the north and one to the south were used to evaluate this anomaly, (see Figure 9-5 below) but assay results indicated less than 0.2% Cu in zones where there is a high density of D-veins and <0.1% Cu elsewhere. The strong IP anomaly is probably the result of the abundant pyrite in the veins. This vein zone has been interpreted as being distal from a further porphyry system but because of thrusting and late-stage normal faulting, the location and depth of this body are difficult to estimate. The drilling clearly defines a lower contact for the vein zone.



Photograph 5: Weathered outcrop showing iron-stained (after pyrite) quartz D-Veins at the Haib South Anomaly.



Figure 9-3: Alteration Geology: Map showing the alteration geology and geochemical sampling of the Haib South anomaly (Source Teck 2012⁽⁴²⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa



Figure 9-4: Map showing the lithology of the Haib South anomaly (Source Teck 2012⁽⁴²⁾) The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa



Figure 9-5: Map showing the location of drillhole collars overlaid on the IP Chargeability contours (50m depth slice of pole-dipole lines) & the Cu in soil >150ppm contour line – Haib South Anomaly (Source Teck 2012⁽⁴²⁾).

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa

The Western anomaly (Location - see Figure 7-7 above) consists of a km-scale soil anomaly coincident with an 800m long, NE trending and SE dipping quartz vein zone (photograph 6 below) truncated in the Northeast by a shear zone. The veins are predominantly A- and B-type quartz veins with only minor EDM veins, and are analogous to those found at the main Haib deposit. The Western anomaly was drilled by RTZ using a single vertical hole. Teck have now drilled two inclined diamond drillholes totalling 735.37m but these were completed before the detailed mapping programme and may not have been sited optimally (see Figures 9-6, 9-7, and 9-8 below). The one Teck hole intersected 44m of 0.22% Cu with a high-grade section of 4m at 0.4% Cu. Again, this anomaly has been interpreted as a distal portion of a separate porphyritic intrusive.

There is some alteration and IP evidence which outlines a further four targets (see Figure 7-7 above) which will require follow-up geophysical, geological mapping and geochemistry work to confirm their potential as exploration targets for drill investigation: -

- The North-western IP anomaly has poorly defined soil geochemistry and has not yet been drilled by HM.
- The South-western anomaly contains extensive sericitic alteration with zones of pyrophyllite and alunite indicating it is very high in the porphyry intrusive alteration system but with no indications of near surface mineralisation.
- The Eastern alteration feature consists of a quartz-rich sericitic alteration zone with minor copper staining within the FP to the immediate south of a dyke of QFP dipping steeply (75 – 80°) to the Southwest.



Photograph 6:

Example of the vein zone at Haib West, with each horizontal fracture representing a quartz vein which weathering has broken open.



Figure 9-6: Map showing the geology and vein densities (%) at Haib West (Source Teck 2015⁽⁴⁵⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa



Figure 9-7: Rock Chip samples collected across the vein zone identified at Haib West, with a background image of contoured vein percentages estimated from outcrop locations in Figure 9-8 below (Source Teck 2015⁽⁴⁶⁾).

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa



Figure 9-8: Drillhole Locations – Haib West: Plan map of Haib West showing the position of the holes drilled in 2012, targeting a zone of veining in the centre of a broad soil anomaly (Source Teck 2013⁽⁴⁵⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa

10. DRILLING

10.1. Historical⁽⁷⁾

At least five separate drilling programmes have been conducted at the Haib; for dates of these programmes see the History Section above.

The first drilling was completed by Falconbridge who drilled eleven drillholes into the deposit in three principal areas of interest. Total drilling of some 1,012 metres was completed. The average grade of the drillhole intersections was given as 0.33% Cu. Very little of this data remains other than the drill core assays and their location in the field. It is not really possible to comment on this programme.

After Falconbridge, King Resources conducted a drilling programme of 21 holes totalling 3,485 metres. Again, this programme has very little useful data surviving, although drill assays are available and the drillhole collars have been located.

Most of these earlier holes were blocked or difficult to locate.

Subsequently, RTZ completed one hundred and twenty diamond drillholes, mostly vertical, on a systematic 150 metre square grid giving a total of 45,903 metres drilled (Figure 18). Holes were on average 300-400 metres deep. These cores are preserved in a shed (see photographs 3 and 4 above) at the old RTZ campsite and are available to study although some mineralised sections are reduced to quarter-core by assay and re-assay campaigns. The information from these drillholes was verified by GFM and incorporated into their geological model. This information was therefore used by Behre Dolbear in the Haib model evaluation presented in section 6.3.4. of this report.

All drillhole assay data is based on diamond drill core, generally "N" or "B" sizes. Drillhole spacing was generally on a regional 150 metre square grid. The RTZ drillholes are mostly vertical, while the earlier Falconbridge and King Resources drillholes are inclined. One section line, 865₀₀ E was partially drilled by RTZ at 25 metres spacing across the zone of high-grade mineralisation. This was the line along which the adit was developed by the NCJV (photograph 2 above).

Sample recovery was reported to be generally good. Most of the historical drillholes were hammer-split and half core composites were sent for assay. The RTZ cores were sampled over 2 metre intervals for determination of total copper and, where appropriate, acid soluble (oxide) copper. Composite samples from each drillhole were tested metallurgically to determine recoverable copper and were assayed for molybdenum, silver and gold indicating average contents of 25 g/t Mo, 0.01 g/t Au, and 0.9 g/t Ag. The reliability of these numbers cannot be assured as assay certificates are not available.

From all of this information Venmyn Rand captured an electronic database of the available 1963-1975 drillhole data using drillhole logs as the original assay data sheets were unavailable. The database comprised 152 drillholes – 120 from RTZ, 21 from King Resources and 11 from Falconbridge.

To this database have now been added the 13 holes drilled by GFM and the 32 drillholes completed by Teck.

In 2010 and 2011, Teck quartered 3,714 metres of RTZ core from 14 drillholes (Figure 10-1 below) on a composited 3-metre sample interval and submitted them for reassay using an *Aqua Regia* digestion method and an Inductively Coupled Plasma Emission Spectrometry (ICP-ES) technique to provide a 24 element determination; the RTZ composite samples were done on a 2-m sample interval whereas Teck composited at a 3-m interval – this means that a comparison of average elemental values can only be made at 6m intervals. The 619 x 6-m average value comparison for copper revealed that below 0.6%Cu the assay results are statistically identical but that bias (~15% positive bias in the RTZ data) creeps into the data above the 0.6% Cu level as shown graphically in the binary X-Y plot below.



It is probable that the $\sim 15\%$ positive bias in the RTZ >0.6% Cu results may be due to RTZ using a 4-acid digestion method which would release copper from silicate minerals, for example the copper in the biotite lattice in the high-grade zones where EDM veins are ubiquitous.

It should be noted that some of Teck's check assays of RTZ core completed in 2010 also used a fire assay in addition to the ICP-ES method, but since virtually all values returned <5ppb Au, it was decided to discontinue the fire assay as a routine assay method.



Figure 10-1: Location of RTZ Drillholes: Plan showing location of RTZ drill collars and those re-assayed by Teck (Source: Teck 2012⁽⁴²⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate - P&E South Africa

An attempt was made by the NCJV to locate and resurvey all drillhole collars completed during the Falconbridge, King Resources and RTZ programmes. The data from this survey is available although not included in this report. Where existing data was available, the eastings and northings were generally found accurate but there were significant discrepancies (up to 80 metres) in the reported drillhole elevations. This factor represented a constraint on the accuracy of the data for geological modelling and on the confidence limits placed on the mineral estimates, but it was not considered that it would have a significant impact on the overall estimate figure as discussed later.

This issue was subsequently resolved by the NCJV which commissioned an Orthophoto survey of the area and generated a new surface topographic plan.

The NCJV/ GFM core drilling programme completed a further 12 infill drillholes for analytical purposes and another 5 large-diameter drillholes for geotechnical work. Technical data is available for these holes. These were reported in an October 2004 report titled "Independent Technical Review, the Haib Copper Porphyry Project, Namibia"⁽⁷⁾.

10.2 Teck Drilling

The most recent drilling programme at Haib was completed by Teck between 2010 and 2014 and comprised 32 diamond drillholes totalling 14,252m. Figure 10-2 below shows the location of the Main Haib deposit drillholes (including historic drillholes) and Photograph 7 shows a diamond drill-rig on site.

These drillholes were used to evaluate several target zones; the first group of 22 holes totalling 10,507.92m was drilled within the existing main Haib mineralised body; the holes were drilled to test: -

- the predictability of the mineralisation grades in the model derived from historical assay data,
- the higher-grade portion of the mineralised body and,
- the deeper portions of the known mineralisation with the deepest hole at 806m depth (some 800m below surface).



Photograph 7:

This photograph shows one of the larger drillrigs used by Teck to drill the deeper drillholes at the Haib eastern anomaly area. This rig is situated in the Volstruisrivier at Haib. Table 10-2 below gives the basic data for all of these 32 drillholes with the Copper and Molybdenum results for significant intervals.

The second group of diamond drillholes tested for mineralisation at the Eastern, Southern and Western combined soil and geophysical anomalies and consisted of 10 holes totalling 3,745.06m. The location of these anomalies is shown in Figure 7-7 above.

10.2.1 Teck's protocol for Drillhole Surveys

The drillhole collar locations are surveyed using a hand-held GPS at the start of the drillhole and a certified land surveyor using a differential GPS surveys all of the drill collars at the end of the programme. Down-hole surveys using a Reflex EZ-Com multi-shot tool are performed on holes in the main Haib body at 6m intervals as rods are pulled from completed holes. Down-hole surveys of the exploration holes into peripheral anomalies use a Reflex EZ-Com single shot tool at 100m intervals during the course of drilling. These instruments have a stated accuracy of 0.1 degrees of dip and azimuth.

10.2.2 Teck's Procedures for drill logging and sampling

All drillhole cores are collected daily and stored in a galvanized steel tray at the core yard. The cores are washed to remove all residual cuttings and drill additives. The core is then measured to determine core recovery and Rock Quality Designation ("RQD"). The average recoveries reported by RTZ were >95% and Teck have measured average recoveries of >99% in the main Haib body and averages of >98% in the more altered peripheral Anomalies. The whole cores are then photographed.

The core is logged for lithology, alteration, structural elements, and mineralisation before being marked up for core cutting and sampling, the core sample length being at the discretion of the geologist, bearing in mind the wish to constrain well mineralised intervals and lithological breaks with recommended minimum 1m and maximum 3m length; to date the sampling tends to average 2m in length. The entire hole is sampled.

The core is halved sampling one half only, although early drillhole core from 2010 and 2011 used quarter-core duplicates, subsequent drillhole sampling has used halfcore duplicates. Core cutting is done on site using a water-cooled diamond saw with the cutter being assigned one hole only and prohibited from wearing any jewellery; The saw is cleaned twice daily using a concrete brick and simultaneously the coolant water settling tanks (2 sequential tanks per machine) are also emptied and cleaned. The half core sample is bagged in good quality plastic sample bags with one sample number tag inside and a duplicate number tag attached to the outside of the bag. The sample bags are batched and transported by Teck personnel to Analytical Laboratory Services, an independent commercial laboratory in Windhoek where the samples are crushed, milled, and split with representative splits shipped by Teck in batches sealed in a box using FedEx couriers to an independent commercial laboratory, Acme Analytical Laboratories, now a subsidiary of Bureau Veritas in Vancouver, Canada for assay. Teck core samples are batched with a blank, standard and duplicate sample inserted every 20 samples. The Windhoek laboratory duplicates every 20th crushed sample to check for any bias after splitting of the crushed sample and for combined preparation and analytical variation (see discussion under section 11 below).

The above protocols ensure minimum probability of sample contamination and the chain of custody is also well defined and ensures minimal opportunity for third party tampering with samples.

10.2.3 Results

The details of holes drilled, their location and significant intersections is summarized in Table 10.2 below.

Several of Teck's drillholes were drilled deeper than the average RTZ hole (about 400m). The deepest Teck hole was TCDH-06 drilled to 842.78m. The log of this hole is shown in Figure 10-3. The hole produced anomalously high copper results (Table 10-2) as the average grade throughout the drillhole was significantly higher than predicted from the mineralisation model derived from previous RTZ drilling.

| Hole No. | From (m) | To (m) | Copper (%) | Molybdenum (%) | | | |
|-----------|----------|--------|------------|----------------|--|--|--|
| TCDH-06 | 0 | 842.78 | 0.285 | 0.011 | | | |
| Including | 349 | 842.78 | 0.36 | 0.018 | | | |
| Including | 537 | 658 | 0.5 | 0.027 | | | |

 Table 10-1:
 Selected assay results for drillhole TCDH-06.

This hole also illustrates the point that historical, vertical drilling may have underestimated the extent and tenor of the high-grade plunging EDM vein sets.

10.3 QP's Comment on Core Sample Representivity and Bias

Since both the RTZ and Teck drilling core recoveries were respectively >95% overall, my opinion is that core sampling fairly represents the values of the particular intersections reported on and core loss, broken ground or voids do not materially impact on accuracy or reliability of results.

The mineralisation is to a large extent in disseminated form and there are only small differences between the sample length and the true thickness of mineralisation for the majority of the drillholes. However, detailed evaluation of the higher-grade sections of the main Haib body which have additional mineralisation in sheeted veins following fractures dip steeply to the south. Teck have detailed surface mapping and logging of inclined drillhole intersections (both RTZ & Teck) through this zone and are confident that their calculations of true thickness of mineralisation within this zone are accurate. Since vein control of high-grade mineralisation is apparent in some locations, care is exercised in sampling intervals where veins run at a low angle to the core axis, since these intervals may overestimate the grade; these occurrences are rare and in my opinion the assay results fairly represent the true grades with minimal bias.



Figure 10-2: Location of All drillholes into the Main Haib Deposit: This map shows the historical drilling together with the recent Teck drilling. The location of drillhole TCDH06 is shown and its log is shown as Figure 10-3. (Source: Teck 2015⁽⁴⁵⁾)

The Haib Copper Porphyry, Namibia - Independent Technical Review & Resource Estimate – P&E South Africa

| Hole ID | Target | х | Y | Zm | Length m | Azimuth | Dip | From | То | Interval | Cu | Мо | | |
|---------|------------|--------|---------|----------|----------|---------|-----|------------------------------|---------|----------------|---------|-------|--|--|
| | | | | | | | | (m) | (m) | (m) | % | % | | |
| TCDH-01 | Haib East | 784102 | 6823216 | 386 | 434.17 | 360 | -90 | No significant Intersections | | | | | | |
| TCDH-02 | Haib East | 783201 | 6823112 | 348 | 350.04 | 360 | -90 | No significant Intersections | | | | | | |
| TCDH-03 | Haib East | 784698 | 6823388 | 309 | 383.23 | 360 | -90 | No significant Intersections | | | | | | |
| TCDH-04 | Haib East | 784709 | 6822725 | 328 | 357.91 | 360 | -90 | No significant Intersections | | | | | | |
| TCDH-05 | Deposit | 791660 | 6000000 | 556 | 806.52 | 14 | -80 | 0 | 806.52 | 806.52 | 0.16 | 0.005 | | |
| Incl. | | 781002 | 0022222 | | | | | 218 | 245.2 | 27.2 | 0.22 | 0.002 | | |
| TCDH-06 | | | | | | | | 0 | 842.78 | 842.78 | 0.28 | 0.011 | | |
| Incl. | Deposit | 781802 | 6822906 | 397 | 842.78 | 194 | -50 | 349 | 842.78 | 493.78 | 0.36 | 0.018 | | |
| Incl. | | | | | | | 537 | 658 | 121 | 0.5 | 0.027 | | | |
| TCDH-07 | | | | | | | | 0 | 822.86 | 822.86 | 0.25 | 0.008 | | |
| Incl. | Deposit | 781667 | 6823026 | 398 | 822.86 | 195.5 | -65 | 231 | 405 | 174 | 0.32 | 0.006 | | |
| Incl. | | | | | | | | 704 | 764.9 | 60.9 | 0.38 | 0.012 | | |
| TCDH-08 | Deposit | 781624 | 6823560 | 468 | 370 | 30 | -60 | No significant Intersections | | | | | | |
| TCDH-09 | Denosit | 781366 | 6823047 | 478 | 602 11 | 15 | -55 | 0 | 602.1 | 602.1 | 0.16 | 0.006 | | |
| Incl. | Deposit | 781300 | 0823047 | 420 | 002.11 | 15 | -55 | 63 | 196 | 133 | 0.36 | 0.010 | | |
| TCDH010 | | 781639 | 6822881 | 415 | 799.11 | 182 | -65 | 0 | 799.9 | 799.9 | 0.29 | 0.012 | | |
| Incl. | – Deposit | | | | | | | 172 | 799.9 | 627.9 | 0.31 | 0.014 | | |
| Incl. | | | | | | | | 227 | 515 | 288 | 0.37 | 0.018 | | |
| Incl. | | | | | | | | 269 | 308 | 39 | 0.53 | 0.020 | | |
| TCDH011 | Denosit | 780763 | 6823093 | 432 | 601.06 | 7 | -60 | 0 | 601.06 | 601.06 | 0.10 | 0.003 | | |
| Incl. | Deposit | , | 0020030 | 452 | 001100 | - | | 170 | 215 | 45 | 0.53 | 0.002 | | |
| TCDH012 | Deposit | 780490 | 6823091 | 431 | 156.26 | 5 | -50 | | No sign | ificant Inters | ections | | | |
| TCDH013 | | | | 2642 297 | 600 77 | 196 | | 0 | 600.77 | 600.77 | 0.19 | 0.003 | | |
| Incl. | Denosit | 782228 | 6822642 | | | | -55 | 14 | 151 | 137 | 0.28 | 0.001 | | |
| Incl. | Deposit | 702220 | 0022042 | 507 | | 100 | 55 | 86 | 139 | 53 | 0.34 | 0.001 | | |
| Incl. | | | | | | | | 20 | 29 | 9 | 0.63 | 0.004 | | |
| TCDH014 | Haib South | 784364 | 6819712 | 380 | 351.33 | 360 | -80 | No significant Intersections | | | | | | |
| TCDH015 | | | | | | | -60 | 0 | 464.02 | 464.02 | 0.2 | 0.002 | | |
| Incl. | Deposit | 781201 | 6823323 | 519 | 464.02 | 10 | | 188 | 242 | 54 | 0.26 | 0.002 | | |
| Incl. | | | | | | | | 50 | 82 | 32 | 0.56 | 0.005 | | |
| TCDH016 | Haib South | 784010 | 6819680 | 435 | 311.06 | 360 | -70 | | No sign | ificant Inters | ections | | | |
| TCDH017 | Haib South | 784601 | 6819729 | 351 | 393.85 | 360 | -90 | No significant Intersections | | | | | | |

Table 10-2: - Details of the Teck Drilling with Significant Intersections.

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(See continuation of Table 10-2 on next page)

Table 10-2 continued

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| Hole ID | Target | х | Y | Zm | Length m | Azimuth | Dip | From | То | Interval | Cu | Мо | |
|---------|------------|----------------|-------------|-----|----------|---------|-----|--------|------------------------------|----------------|---------|-------|--|
| | | | | | | | | (m) | (m) | (m) | % | % | |
| TCDH018 | | | | | | | | 0 | 455 | 455 | 0.1 | 0.002 | |
| Incl. | Deposit | 781566 | 6823254 | 494 | 460.95 | 14 | -60 | 63 | 69 | 6 | 0.26 | 0.023 | |
| Incl. | | | | | | | | 269 | 279 | 10 | 0.26 | 0.001 | |
| TCDH019 | Haib South | 784394 | 6819590 | 415 | 428.1 | 182 | -60 | | No significant Intersections | | | | |
| TCDH020 | | | | | | | | 0 | 497.12 | 497.12 | 0.24 | 0.006 | |
| Incl. | Deposit | 781600 | 6823460 | 476 | 497.12 | 360 | -90 | 116 | 472 | 356 | 0.3 | 0.008 | |
| Incl. | | | | | | | | 256 | 270 | 14 | 0.39 | 0.005 | |
| TCDH021 | Deposit | 782397 | 6822631 | 404 | 314.25 | 190 | -60 | | No sign | ificant Inters | ections | | |
| TCDH022 | | | | | | | | 0 | 477.48 | 477.48 | 0.21 | 0.011 | |
| Incl. | Deposit | 781265 | 6822888 | 435 | 477.48 | 12 | -60 | 332 | 425 | 93 | 0.44 | 0.007 | |
| Incl. | | | | | | | | 383.65 | 415.52 | 31.84 | 0.79 | 0.010 | |
| TCDH023 | | | | | | 21 | | 0 | 376.83 | 376.83 | 0.08 | 0.001 | |
| Incl. | Haib West | 778372 | 6823136 | 494 | 376.93 | | -60 | 180 | 204 | 24 | 0.2 | 0.001 | |
| Incl. | | | | | | | | 276 | 296 | 20 | 0.24 | 0.003 | |
| TCDH024 | Haib West | 778074 | 6823190 | 653 | 358.44 | 10 | -60 | | No sign | ificant Inters | ections | | |
| TCDH025 | | 781435 | 6822603 | 528 | 568.7 | 360 | | 0 | 568.7 | 568.7 | 0.22 | 0.005 | |
| Incl. | Donosit | | | | | | -90 | 71.7 | 122.4 | 50.7 | 0.21 | 0.013 | |
| Incl. | Deposit | | | | | | | 402 | 480.6 | 78.6 | 0.32 | 0.005 | |
| Incl. | | | | | | | | 20 | 50 | 30 | 0.36 | 0.003 | |
| TCDH026 | | Deposit 781024 | | 495 | | | | 0 | 475.3 | 475.3 | 0.3 | 0.007 | |
| Incl. | Denesit | | (822562 | | 475.00 | 192 | -70 | 349 | 427 | 78 | 0.31 | 0.021 | |
| Incl. | Deposit | | 0823303 | | 475.55 | | | 178 | 327 | 149 | 0.57 | 0.004 | |
| Incl. | | | | | | | | 283 | 313 | 30 | 0.81 | 0.007 | |
| TCDH027 | | | | | | | | 0 | 446.07 | 446.07 | 0.2 | 0.006 | |
| Incl. | Deposit | 781528 | 6823066 | 409 | 446.07 | 10 | -60 | 207 | 262 | 55 | 0.27 | 0.004 | |
| Incl. | | | | | | | | 0 | 87.5 | 87.5 | 0.31 | 0.013 | |
| TCDH028 | | 780804 6823001 | | | 401.34 | | | 0 | 401.14 | 401.14 | 0.15 | 0.010 | |
| Incl. | Deposit | | 6823001 442 | 442 | | 360 | -90 | 20 | 182 | 162 | 0.27 | 0.014 | |
| Incl. | | | | | | | | 146 | 176 | 30 | 0.45 | 0.023 | |
| TCDH029 | | | | | | | | 0 | 200.11 | 200.11 | 0.27 | 0.005 | |
| Incl. | Deposit | 780816 | 6822996 | 458 | 200.11 | 185 | -60 | 71.1 | 125.5 | 54.4 | 0.4 | 0.004 | |
| Incl. | | | | | | | | 90 | 99.2 | 9.2 | 0.75 | 0.007 | |

(See continuation of Table 10-2 on next page)

| Hole ID | Target | х | Y | Zm | Length m | Azimuth | Dip | From | То | Interval | Cu | Мо |
|---------|---------|--------|------------|-----|----------|---------|-----|--------|--------|----------|------|-------|
| | | | | | | | | (m) | (m) | (m) | % | % |
| TCDH030 | | 781309 | 6823077 | 457 | 200.51 | 12 | -65 | 0 | 200.51 | 200.51 | 0.29 | 0.013 |
| Incl. | Danasit | | | | | | | 39.7 | 92.7 | 53 | 0.41 | 0.012 |
| Incl. | Deposit | | | | | | | 103.22 | 200.51 | 97.29 | 0.30 | 0.018 |
| Incl. | | | | | | | | 51.3 | 77 | 25.7 | 0.66 | 0.019 |
| TCDH031 | | 781432 | 6822985 | 435 | 200.47 | | -60 | 0 | 200.47 | 200.51 | 0.27 | 0.010 |
| Incl. | Denesit | | | | | 15 | | 62.9 | 164.2 | 101.3 | 0.36 | 0.008 |
| Incl. | Deposit | | | | | 15 | | 81.27 | 121.8 | 15.67 | 0.49 | 0.260 |
| Incl. | | | | | | | | 51.3 | 137.47 | 9.57 | 0.54 | 0.007 |
| TCDH032 | | 781900 | 6822630 40 | 400 | 200.1 | 100 | -60 | 0 | 200.1 | 200.1 | 0.26 | 0.002 |
| Incl. | Deposit | | | | | | | 4 | 37.3 | 33.3 | 0.33 | 0.002 |
| Incl. | | | | 408 | | 199 | | 77 | 82 | 5 | 0.45 | 0.004 |
| Incl. | | | | I | | | | 110 | 117 | 7 | 0.58 | 0.004 |

Table 10-2 continued

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Figure 10-3: This diagram shows the strip log for drillhole TCD-06, the deepest hole drilled at Haib by Teck. This drillhole was located just west of the centre of the main deposit at one of the lowest points (in the Volstruis riverbed). It can be seen that sections of this drillhole below 500m returned significantly high copper values and above average Molybdenum values (Source: Teck, 2012⁽⁴²⁾).

11. SAMPLING PREPARATION, ANALYSIS AND SECURITY

11.1 Historical Sampling

The historical drilling database comprises physical details of each hole, a drill lithological log, details of sampling intervals and assay results from approximately 25,000 samples of which the vast majority are 2 metre half-core composite samples from the Rio Tinto drilling (22,800 samples). The King Resources composite samples averaged 4.5 metres average length, while the Falconbridge samples were an average 3.0 metre length.

Of the total samples approximately 15,000 have values greater than 0.1% Cu but only 1,100 have values greater than 0.5% Cu. The acid soluble oxide-copper database comprises 1,980 samples.

Specific gravity ("SG") measurements were carried out by RTZ on 40 drillholes giving approximately 7,000 determinations; SG's ranged from 2.43 to 3.35 and averaged 2.71; GFM continued the process of SG determinations on core samples during their drilling campaign, sampling every tenth sample.

It is not possible for me to comment on the sample preparation, analysis and security of these historical drill samples as the details of quality control and assurance and copies of original assay certificates are not available. It is known that the RTZ samples (22,800) were all prepared on site, Rio Tinto having a prep-laboratory at the campsite fitted with crusher, pulveriser and splitters – the dust extractor plus parts of the other equipment are still on site. It is believed that the actual analyses were done off site at both the RTZ Rossing mine and RTZ Palaborwa mine laboratories.

11.2 Teck Sampling

No core sampling was being carried out at the time of the site visits so I was unable to verify or review the Teck sampling procedures. I have been supplied with an internal Teck memorandum ⁽³⁹⁾ detailing the sample preparation protocols to be employed during both core and geochemical sampling at the Haib project and I have been assured that these protocols are strictly enforced on site and at the independent prep-laboratory in Windhoek (Analytical Laboratory Services) and the independent assay laboratory (Acme Analytical Laboratories – <u>www.acmelab.com</u>, now a subsidiary of Bureau Veritas) ("Acme") in Vancouver, Canada. The protocol lists the following important steps: –

 A standard sample to monitor analytical accuracy, a field blank sample to monitor carry-over contamination at the crusher and a core (or soil/stream/rock) duplicate sample to monitor geological, preparation and analysis variation are to be inserted in the core-shed every 20 samples. The appropriate standards used at the Haib are sourced from CDN Resource Laboratories in Canada who have supplied certificates certifying the material supplied. I have had sight of a selection of these certificates and am satisfied as to their veracity and appropriateness in terms of the range of expected values for copper, gold and molybdenum.

- All drillholes are sampled from the start to end of hole; the core is split using a
 water lubricated diamond saw blade which is cleaned frequently by using a brick
 to prevent carry-over contamination. Core samples are bagged in good quality
 plastic bags to avoid contamination or loss of fine material during transport.
 Sequential sample numbers are assigned and recorded on the paper drill log
 sheet. All of the hole's survey, logging and sampling data are captured and stored
 in a secure database system (Excel) on a laptop in the field and backed up by
 transfer to a central Access database system in Windhoek. All data is subject to
 routine validation during capture and storage. Drill log sheets, survey records
 and drill assay certificates are all securely filed in Windhoek on a regular basis.
- At the independent sample preparation laboratory in Windhoek the entire sample is dried, crushed and check screened to ensure that at least 80% of the crushed material passes through a 2mm screen; the entire crushed sample is riffle split to approximately 1Kg and this is pulverized in a disk mill as a single charge with testing of the pulp to ensure that a minimum 80% is <75 microns. Every 20 samples a duplicate sample is drawn off of the riffler to assess combined preparation and analytical variation. All of the sizing tests are recorded in a book to ensure compliance. Samples that do not pass the sizing tests are re-crushed or re-milled until a pass is obtained. The preparation laboratory cones and quarters the pulp sample to obtain a 100gm of material which is bagged in a good quality paper envelope. The entire remaining crushed and pulped sample is retained and stored by Teck so that umpire samples may be taken.</p>
- The drill core assays routinely include copper, molybdenum, gold and 21 additional elements all determined by an ICP-ES technique.
- The Acme Vancouver facility has maintained a quality system compliant with the International Standards Organization (ISO) 9001 Model for Quality Assurance and ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories. In October 2011 the Vancouver facility received formal approval of its ISO/IEC 17025:2005 accreditation from Standards Council of Canada.
- The Analytical Laboratory Services facility in Windhoek is not certified as being ISO 17025 compliant. QA is provided by replicate analysis, the insertion of control samples, the submission of samples to independent laboratories in Namibia and the participation in independent proficiency testing schemes.

Teck have stated on public record that: -

"The design of Teck's drilling programme, quality assurance / quality control programme and the interpretation of results are under the control of Teck's geological staff. The QA/QC programme is consistent with industry best practices. Drill core is logged and cut onsite, with half-core samples prepared at Analytical Laboratory Services, Windhoek, Namibia. Prepared samples are shipped to Acme Analytical Laboratories, Vancouver, Canada for appropriate base metal assaying and gold fire assaying techniques. All analytical batches contain appropriate blind standards, duplicates and blanks inserted at regular intervals to independently assess analytical accuracy and precision."

11.3 Sample Security

The core yard at the Haib camp is surrounded by 2m wire fencing and the metal entrance gate is secured by a padlock. I am assured by the site geologist that sampling of core is done under his supervision; the bags are secured immediately after the cutting and sampling process and the samples taken are stored within the locked RTZ laboratory building within the core yard until transported by him to Windhoek.

11.4 Data Verification

The Teck guidelines for data verification are as follows:

- The guideline for Standard failure is: Any Standard sample which falls outside of the mean +/- 3 standard deviation range or any two consecutive sample results outside of the mean +/- two standard deviations range.
- Re-analysis is at the discretion of the geologist, but the guideline is that any failure (as with CM-5 below) should trigger re-assay of all samples from the first sample after the previous passing Standard sample to the sample previous to the next passing Standard.

An example of Teck's graphical plots, this one for Standard Sample No.CM-5 is given below:



11.5 QPs' Comments on Sample Preparation, Analysis and Security

In our opinion Teck's knowledge regarding the controls on high grade zones ensures that there is no bias in their sampling. On the assumption that Teck personnel strictly adhere to their protocols regarding sample collection, transport, preparation, security and analytical procedures, then the reliability, validity and integrity of the sample assay results should be assured. Assuming that Teck personnel are adhering to their stated procedures, the chain of custody in sample collection and transport would be well controlled.

Teck used duplicates, standards and blanks to check the accuracy and precision of their assay data. The amount of QC / QA data is significant and the spreadsheet files and graphical presentation of their results have been check sampled by us and found to be adequate to ensure veracity of their results.

In the authors' opinion there is no relationship between Analytical Laboratory Services in Windhoek and/or Acme and/or Teck as operator for HM apart from a normal principal and client business relationship and both laboratories can be classified as independent applying all of the standard tests of independence.
12. DATA VERIFICATION

12.1 Historical Data

Original assay laboratory sheets or certificates were not located for the Falconbridge, KRC, or RTZ data. In addition, there were no records of any assay duplicates, field resplits or check assays having been carried out by independent laboratories.

The RTZ drill samples were collected as composite half core samples over 2m sampling intervals and a total of some 45,865 metres has been assayed. Validating this database has been difficult because the assays were done at the RTZ Rossing laboratory with every tenth sample check assayed at the RTZ Palaborwa Mine laboratory. No original or copies of assay certificates have been located to validate the historical database. In order for HM to utilize the RTZ data in any future resource estimate, re-assaying of important intervals of RTZ core is required; this programme has been implemented – see discussion under section 10.1 above.

The NCJV drilling (completed after the Behre Dolbear historical estimates), supported the mineralisation models created from previous assay results but could not verify them.

RTZ also prepared extensive metallurgical composites comprising sequential down-hole samples over approximately 20 metres. A historical estimate carried out by GFM based solely on this composite data gave comparable results to estimates using the other drill assay data.

12.2 Teck Resampling

Due to the difficulty of validating the previous drilling, and in particular the RTZ database, in 2010 and 2011 Teck re-logged and re-assayed 619 x 6m quarter-core composites of the RTZ drillhole cores from 14 drillholes (see Figure 10-1 above) representing approximately 8% of the RTZ assay data and could potentially extend this programme of RTZ core analysis so that it can be included in a future compliant resource estimate – please see our discussion of the comparative results in Section 10.1 above. RTZ only assayed for copper on a systematic basis while all of the Teck assays routinely include copper, molybdenum, gold and 21 additional elements all determined by an ICP-ES technique.

12.3 Assessment of Quality Control Data

Obsidian Consulting Services conducted a review of the QA/QC programme implemented by Teck using the certificates of analysis received from Acme Labs and provided by Mr Neil Grumbley of Teck. This review compared the results of field duplicates, blanks as well as the various standards utilised with respect to Cu and Mo.

12.3.1 Duplicates

Two types of field duplicates were utilised viz. core samples and crusher duplicates. Figure 12-1 shows scattergrams of the original core sample Cu and Mo grades versus the duplicate grades. The left-hand charts show the full data extents while the right-hand charts zoom into the lower grade areas. From Figure 12-1, it can be seen that most of the core duplicates for Cu fall within the $\pm 10\%$ limits from a correlation of one and that 14 of the 415 (3%) core duplicates fall outside of the $\pm 25\%$ limits. The R² (Pearson's Coefficient) of 0.94 confirms the sampling procedures for the core sampling and the reproducibility of the associated results to be of a good quality.



Figure 12-1: Quantile-Quantile plots comparing core original assays and core duplicates. The right-hand graphs have zoomed in near the low-grade samples as indicated by the X axes values.

This is less true for the Mo results. While generally the bulk of results fall within the $\pm 25\%$ limits, a relatively low R² of 0.7789 is borne out by the fact that 63 of the 253 (25%) duplicates for Mo lie outside the $\pm 25\%$ limits. Most of these lie at a Mo grade of <10ppm which means the assays here have been undertaken right at the limits of assay ability and these results are to be expected to some degree. Any impact is not material at the resource scale though and it is likely this can be attributed to a "Fundamental Error" being a function of the contained grade.

The duplicates produced at the crushing stage were then analysed and are presented in Figure 12-2 below. Again, the Cu results point to good work within the crushing procedures as shown by the R^2 of 0.98 and only 5 samples (1%) falling outside the

 $\pm 25\%$ limits $\pm 25\%$ limits. The Mo results again are not as good as the Cu results, however most of the failures for Mo are at concentrations below 10ppm which is right on the edge of practical constraints during the crushing procedure.



Figure 12-2: Quantile-Quantile plots comparing crusher original assays and crusher duplicates. The right-hand graphs have zoomed in near the low-grade samples as indicated by the X axes values.

12.3.2 Blanks -

Figure 12-3 below shows a line graph (black) of the Cu and Mo grades received for submitted blanks along with the average grade of the batch (red shading) with which the blank was analysed. The purpose of these is to highlight erroneous results and quantify them relative to the batch results.

In the case of the Cu results, there were a couple of significant failures indicated in Figure 12.3 by labels of the respective sample numbers; there are only 13 failures from 415 blanks (3%) which is indicative of little or no contamination during sampling or during analysis. One issue though is highlighted by the blue shading where a number of sequential blanks failed. It is not known whether this is due to contamination during sampling in the field, instrument calibration or even an issue of homogeneity with the blank material but Teck's procedures would have highlighted the matter and it is assumed the issue was examined in detail at the time and resolved.

With respect to Mo, there are a couple of noticeable issues (see Figure 12-3 below). Initially, the blanks returned values of between zero and about 5ppm (1). For some

reason at about halfway through the programme, this range changes to between zero and 30 with a mean at about 10ppm ((2)). In some cases, the values returned by the blank are higher than the batch mean which raises some concerns about the quality of the Mo grades received.

Possible causes of this include;

- Instrument calibration
- Blank material not suited for Mo
- Crushing chamber not being adequately cleaned between samples. This is certainly feasible for Mo as molybdenite is malleable and ductile and can be "smeared" on internal surfaces during crushing.



Figure 12-3: Line graphs of blank results for Cu and Mo comparing them to Batch Mean's and ordered by sample number

12.3.3 Standards

Thirteen different mineral standards were used by Teck as part of their QA/QC programme. The summary statistics of the standards are tabulated in Table 12-1 below. Note that only certified values are shown.

Regarding Cu assays, the CGS and CM standards cover a range of values from 0.112% to 0.725% which is appropriate for the grade ranges encountered at Haib. The Relincho standards comprise two very low-grade standards (ST1 and ST2) and one further standard with Cu grade approaching 1%.

Regarding the Mo assays, the standards cover a low of 0.004% (40ppm) to 0.05% (500ppm). Again, the available range is generally suited to the Mo grades found at Haib. A summary of the results of the standards is provided in Table 12-1. Generally, pass rates exceed 90% with only the Relincho ST-3 standard raising some issues with only 2 of the 4 samples submitted passing. The Mo standard results are generally good.

| Table 12-1: 3 | Summary of | the certified | standard | materials | used by | Teck. |
|---------------|------------|---------------|----------|-----------|---------|-------|
|---------------|------------|---------------|----------|-----------|---------|-------|

| | | | Ce | ertifed V | alues On | ly | | | | Res | ults | | |
|---------------|------------|-------|-------|-----------|----------|-------|-------|-------------|----------|-------|-------------|----------|-------|
| | | Cu(| (%) | Au (| g∕t) | Mo | (%) | | Cu | | | Мо | |
| | | Mean | 2SD | Mean | 2SD | Mean | 2SD | No. Samples | Failures | %Pass | No. Samples | Failures | %Pass |
| CGS-16 | 4-acid | 0.112 | 0.005 | 0.140 | 0.046 | | | 69 | 5 | 93% | | | |
| CGS-22 | 4-acid | 0.725 | 0.028 | 0.64 | 0.06 | | | 14 | 1 | 93% | | | |
| CGS-23 | 4-acid | 0.182 | 0.010 | | | | | 75 | 4 | 95% | | | |
| CGS-24 | 4-acid | 0.486 | 0.034 | 0.487 | 0.05 | | | 43 | 3 | 93% | | | |
| CM-4 | 4-acid | 0.508 | 0.025 | 1.18 | 0.12 | 0.032 | 0.004 | 28 | 2 | 93% | 16 | 2 | 88% |
| CM-5 | 4-acid | 0.319 | 0.020 | 0.294 | 0.046 | 0.050 | 0.005 | 41 | 6 | 85% | 11 | 0 | 100% |
| CM-7 | 4-acid | 0.445 | 0.027 | 0.427 | 0.042 | 0.027 | 0.002 | 16 | 0 | 100% | | | |
| CM-16 | 4-acid | 0.184 | 0.014 | | | 0.016 | 0.002 | 45 | 1 | 98% | 34 | 2 | 94% |
| CM-10 | Aqua regia | 0.184 | 0.016 | | | 0.016 | 0.003 | | | | | | |
| CM-20 | 4-acid | 0.316 | 0.016 | | | 0.030 | 0.002 | 32 | 0 | 100% | 28 | 2 | 93% |
| CH-20 | Aqua regia | 0.314 | 0.014 | | | | | | | | | | |
| | Fire Assay | | | 0.467 | 0.052 | | | | | | | | |
| CM-21 | 4-acid | 0.527 | 0.022 | | | 0.036 | 0.002 | 9 | 0 | 100% | 7 | 2 | 71% |
| | Aqua regia | 0.530 | 0.028 | | | | | | | | | | |
| | Aqua regia | 0.018 | 0.002 | | | | | | | | | | |
| Relincho ST-1 | 3-acid | 0.019 | 0.002 | | | | | | | | | | |
| | 4-acid | 0.018 | 0.002 | | | | | 13 | 0 | 100% | | | |
| | Aqua regia | 0.076 | 0.006 | | | | | | | | | | |
| Relincho ST-2 | 3-acid | 0.076 | 0.008 | | | 0.004 | 0.000 | | | | | | |
| | 4-acid | 0.075 | 0.008 | | | | | 21 | 0 | 100% | | | |
| | Aqua regia | 0.835 | 0.046 | | | 0.016 | 0.002 | | | | | | |
| Relincho ST-3 | 3-acid | 0.823 | 0.034 | | | 0.016 | 0.002 | | | | | | |
| | 4-acid | 0.832 | 0.032 | | | 0.016 | 0.002 | 4 | 2 | 50% | | | |

Figure 12-4 below provides plots of the results of standards CGS-16, CGS-23 and CGS-24. From this Figure, it can be seen that while the reported values lie within the \pm 3 Standard Deviation range applied by Teck, most of the values lie below the certified mean. For CGS-16, 80% are below the mean, while 83% of CGS-23 samples and 63% of CGS-24 samples respectively are below the certified mean.



Figure 12-4: Plots of standard results for Standards CGS-16; CGS-23 and CGS-24 ordered by sample number.

This implies a potential instrument calibration error (though minor scale). Depending on the standard used, this error varies between 0.5% and 5%. As these standards account for ~46% of the total standards submitted, it can be inferred that nearly half the Cu grades are underestimated by somewhere between 0.5% and 5% i.e. percentages of their reported values and not whole numbers.

12.4 The QP's Overall Interpretation of the QA/QC Programme

The QA/QC program implemented by Teck was aligned with international standards and has generally delivered good results. The field duplicates show that sampling practises employed by Teck have produced accurate, repeatable results especially for Cu. Due to the low Mo grades involved, greater deviation is present though this is expected due to the fact that the sampling is being done so close to the lower detection limits for Mo.

The field blanks show that as a rule, contamination of Cu samples has been kept low by the sampling practices. The selected blank was appropriate for Cu and exceptions are readily visible. There do appear to be some issues with respect to blanks for Mo. Mo values returned for the blank material are commonly a significant proportion of the average Mo grade of the associated batch. It is not known whether this is due to an inappropriate blank for Mo or laboratory issues but it does cast some suspicion on the Mo grades. A further benefit of the QA/QC programme utilised by Teck is that it provides a basis for comparison to the historical data to determine the quality of this data. This was done as follows. Boreholes with QA/QC data were tagged separately from those without QA/QC and were superimposed on the resource model. This is shown in Figure 12-5 where boreholes with QA/QC are shaded red and those without, black. From Figure 12-5, it can be seen that the two sets are relatively well interspersed particularly in the central portion of the deposit.

Within the shaded area in Figure 12-5, the two sets of drilling have sampled approximately the same sample space. The distributions of Cu samples (in ppm to provide more resolution for comparison) with QA/QC were compared to those samples without QA/QC. This was done using a QQ Plots which is shown in Figure 12-6. The reasoning behind this was that if there is no bias between the two sets of data, the curve should plot on or near the 45° dashed line depicting perfect correlation.



Figure 12-5

Figure 12-5: Plan showing the Haib resource 3D models and the associated drilling data coloured according to whether completed under QA/QC or not.



Figure 12-6: QQ Plots comparing by resource domain, the distributions of Cu results from samples taken under an appropriate QA/QC regime and those that weren't.

A look at Figure 12-6 shows that there is excellent correlation between the two. For this reason, it is the opinion of Obsidian Consulting that the historical data, despite their lack of QA/QC can be merged with the Teck dataset for use in mineral resource estimation without concerns about the introduction of any material bias.

13. MINERAL PROCESSING & METALLURGICAL TESTING

13.1.1 Historical Metallurgical Testwork – 1990's

In early 1996 NCJV commissioned engineering firm Davy & Minproc (in joint venture) to prepare a feasibility study for the Haib Copper Project ⁽¹⁷⁾.

The first phase of the feasibility study involved an extensive programme of metallurgical test work; to accommodate this test work, a sampling programme involving diamond drilling and the excavation of an adit (photograph 2) and cross-cuts into a representative section of the defined mineralisation was completed. This involved some 150 metres of underground development of an adit at a nominal 2 x 2 metre cross-section with two short cross-cuts at the end of the adit. This adit and cross-cut generated some 2,000 tonnes of fresh material for metallurgical test-work. The adit intersected higher grade material delineated by RTZ's close-spaced drilling on section 000E/W. The 2,000 tonnes of rock were removed from the adit, stacked in heaps representing each 1m advance of the excavation and then sampled. This resulted in the accumulation of a representative bulk sample of some 500 tonnes which was sent to various laboratories for test-work. The balance of 1,500 tonnes is still stockpiled on site (see photograph 8).



Photograph 8: The remaining metallurgical bulk sample stacked in separate heaps.

Test work was done at the following laboratories: -

- Mintek, Johannesburg, South Africa.
- University of the Witwatersrand, Johannesburg, South Africa.
- Metcon, Tucson, Arizona, USA.
- Amdel, Adelaide, S. Australia.
- Ammtec, Perth, W. Australia.

Test work included: -

- Mineralogy.
- Flotation.
- Comminution.
- Roasting & Acid Leaching of concentrates.

- Autogenous and semi-autogenous milling.
- Bacterial oxidation of concentrates.
- Column leach test work for heap leaching.

The reports generated by this study are listed in the References and Bibliography section of this Report numbered 10 to 17 and the results are summarized in the Davy-Minproc phase II feasibility study ⁽¹⁷⁾ and the NCJV Feasibility Study - Executive Summary report ⁽⁹⁾. The results of these various studies are summarized in the following paragraphs.

The basic initial test work results showed that the Haib mineralisation is a competent quartz feldspar porphyry rock having a ball mill work index of between 17 and 20. The copper mineralisation is primarily chalcopyrite which is highly amenable to flotation. The test work indicates that grinding to 80% passing 150 microns will yield an overall Roast Leach Electrowin ("RLE") recovery to cathode copper of 83.7%.

The second phase test work involved the design and costing of a 34.2Mtpa RLE plant with an associated 14Mtpa heap leach operation reported on in the Davy-Minproc report ⁽¹⁷⁾. This showed a RLE treatment cost at that date of US\$2.36/tonne plus a contingency of 10%. At then current comparable rates, this was regarded as a low-cost metallurgical operation; because of this low cost and successful conventional RLE treatment process the NCJV management decided not to incorporate heap leaching in further studies despite the good results achieved in column test work at the Metcon Laboratories in Arizona.

The NCJV then embarked on definitive engineering studies to design and cost all the mining and metallurgical plant and equipment required to mine at Haib, as well as preliminary environmental studies ^(24 to 33) prior to definitive drilling of the selected open pit area and then the production of a final bankable feasibility study. The NCJV then ran into financial difficulties and the further test work was abandoned.

13.1.2 Modern Metallurgical Testwork

In 2003, at the request of Mintek, the then claim holder Mr. George Swanson provided a 1-tonne sample of oxide mineralisation and a 1-tonne sample of sulphide mineralisation from Haib so that Mintek could do further testing of their new proprietary heap bio-leach process $^{(14)}$.

The oxide sample was crushed to -25mm and blended to homogenize it before subsampling. Sub-samples were submitted for chemical assay, mineralogical study and sieve size analysis. Roll bottle tests on samples determined the acid consumption characteristics of the mineralisation and the particle size of copper leach kinetics. Column test work to determine agglomeration requirements and percolation tests at various irrigation rates were completed.

The results indicated that: -

- The oxide copper sample contained 3% Cu.
- The copper is present as acid-soluble silicates and carbonates.

- Copper extraction of 70% to 93% is possible with acid consumption of 1.9 to 2.4kg acid/kg Cu.
- The feed acid concentration should be kept at 10g/l for maximum extraction.
- Highest extractions were obtained at -12mm & -6mm crush sizes.

The sulphide sample was treated in a similar fashion and the results indicated: -

- The mineralised sulphide sample contained some 0.6% copper.
- The copper is present as chalcopyrite associated with pyrite.
- The mineralised sulphide is difficult to agglomerate & pellitising was tried.
- Higher temperatures and lower crush sizes improved the leach kinetics.
- The best extraction for 6mm material at 65^oC was 80% Cu recovery over a 200day period.

Neither Mintek nor Swanson has made any economic assessments of these test results.

13.1.3 Metallurgical Testwork in progress

HM have commissioned METS Engineering Consultants to examine the latest metallurgical process technology and review the historical test work and then develop conceptual ideas for processing options. METS have been commissioned to complete a Preliminary Economic Assessment using the results of their processing study and the Resource Estimates completed by Obsidian Consulting Services. This report should be published in the near future.

METS Engineering has completed the mineral processing and metallurgical study ⁽⁵²⁾ that considers amongst others:

- Comminution
- Heavy Liquid Separation
- Bio-Heap Amenability
- Flotation

Four recovery options were considered for economic evaluation: -

- Option 1: Ore sorter upgrading, dense media upgrading, flotation and heap leaching of the tails.
- Option 2: Two-stage dense media upgrading, flotation and heap leaching of the tails.
- Option 3: Ore sorter upgrading and heap leaching of the upgraded material.
- Option 4: Whole ore heap leaching.

13.2 QP's Comments

The NCJV adit was located specifically to test a cross section of the oxide mineralisation as well as normal grade and high grade sections of the defined copper / molybdenum sulphide mineralisation; as such, the metallurgical samples can be regarded as being closely representative of all of the mineralisation at Haib and none of the metallurgical or feasibility reports indicate anything to the contrary; neither RTZ, NCJV or Teck have shown the presence of any deleterious elements that could have a significant effect on potential economic extraction.

Teck considered further metallurgical test work and drilled 4 diamond drillholes totalling 801.19m of HQ diameter (63.5mm) core with the intention of taking samples from the high-grade zones to be able to verify the metallurgical characteristics and perhaps for testing the amenability of the material to various (and more modern?) copper extraction techniques. Teck, however, did no further metallurgical testwork.

HM have commissioned a Preliminary Economic Assessment which will make use of the historical metallurgical test work and once this PEA is complete and positive, then HM will probably commission further metallurgical studies on both existing adit samples, Teck's drillhole samples and any new metallurgical drillhole samples from a yet-to-be planned mining area.

14. MINERAL RESOURCE ESTIMATES

14.1 Introduction

In July 2017, Obsidian Consulting Services, an independent geological consultancy, conducted a mineral resource estimate for the Haib Copper Project using the outputs of some 3D modelling work that had been completed by Teck using the LeapFrog GEO software package. The models were analysed with respect to their grade distributions and an appropriate domain was selected on which the mineral resource estimate was then based. A mineral resource classification based principally on data density was applied to derive a mineral resource statement.

14.2 Source Data

14.2.1 Drillhole Data

All the available drill hole data for Haib was compiled in a single Geovia-GEMS project. The summary statistics of the complete, compiled drill hole database are given in Table 14-1. Of significance from this is the fact that Cu assays outnumber Mo assays by more than 3:1 while the deepest intersections achieve a depth of more than 800m below the surface topography.

| | | | | | | | Mo As | says |
|-------------------|--------------|----------------------------|-----------|-------------------|---------------|--------------|---------|--------|
| Series | No. Holes | Suitable for Estimation | Total (m) | Average m/hole | Max. Depth | Cu Assays | Assayed | Visual |
| ADIT01 | 1 | 1 | 126.00 | 126.00 | 40 | 63 | 63 | |
| GFMHB01 - GFMHB12 | 15 | 15 | 4,726.40 | 315.09 | 464 | 2,186 | 2,034 | |
| H01 - H12 | 11 | 11 | 1,010.72 | 91.88 | 225 | 253 | 0 | |
| HB001 - HB210A | 121 | 121 | 45,795.15 | 378.47 | 653 | 22,838 | 1,530 | 1630 |
| KO1 - KO4 | 3 | 3 | 151.49 | 50.50 | 49 | 34 | 0 | |
| KS01 - KS21 | 18 | 18 | 3,324.76 | 184.71 | 288 | 727 | 0 | |
| TCDH-01 - TCDH032 | 32 | 32 | 14,252.93 | 445.40 | 796 | 5,999 | 5,999 | |
| | 201 | 201 | 69,387.45 | 345.21 | | 32,100 | 9,626 | 1,630 |

Table 14-1: Summary drilling statistics by drilling programme

The positions of the drill holes relative to the modelled portion of Haib are given in Figure 14-1. The borehole collars are coloured as to whether they were subjected to a QA/QC programme (red) or not (black).



Figure 14-1: Plan showing the limits of the geological modelling conducted by Teck with the available drilling overlaid.

14.2.2 Three Dimensional Models

A summary listing of the received 3D models from Teck is given in Table 14-2 while Figure 14-2 shows an isometric view of these. The geological model comprises major faults as well as lithological models. The Cu grade isoshells were provided, the first approximating a 0.3% grade limit, the second 0.2%. An isoshell of Mo grades elevated above background levels was also received.



Figure 14-2: Isometric view showing the various 3D models received from Teck.

| Туре | LeapFrog File |
|------------------|-----------------------------------|
| Topography | Haib_Topography.dxf |
| | GM_Lithology -EW FAULT.dxf |
| Structural Model | GM_Lithology -NorthShear.dxf |
| | GM_Lithology -NS QV.dxf |
| | GM_Lithology -FP.dxf |
| | GM_Lithology - QBP.dxf |
| Geology | GM_Lithology - QFP.dxf |
| | GM_Lithology - QFP2.dxf |
| | GM_Lithology - XPBX.dxf |
| | GM_GradeOutlines - High Grade.dxf |
| Grade Isoshells | GM_GradeOutlines - Low Grade.dxf |
| | GM_GradeOutlines - Mo Outline.dxf |

Table 14-2: Listing of files received from Teck

14.3 Domain Selection

Each of the solid models received represents a potential domain for resource estimation and reporting. The univariate statistics were calculated for each and are shown in Table 14-3. The Mo mineralisation isoshell was not considered as Mo was viewed as secondary relative to Cu. Of the lithological models, the QBP and XPBX show the highest mean and median grades, followed by the QFP's and then the FP. Notwithstanding this, the differences in grade are muted with each showing similar ranges in Cu grade. This implies that rather than being restricted to a single domain, the Cu grade is distributed throughout the deposit.

| | | Cu (%) | | | | | | |
|--------------------------|--------|--------|-------|-------|---------|-------|---------|---------|
| | All | FP | QBP | QFP | QFP2 | XPBX | >0.3 Cu | >0.2 Cu |
| Count | 32,100 | 2,929 | 2,074 | 6,808 | 10,159 | 3,679 | 5,738 | 13,969 |
| Minimum value | 0.000 | 0.001 | 0.010 | 0.001 | 0.005 | 0.001 | 0.001 | 0.001 |
| Maximum value | 4.470 | 2.242 | 2.150 | 3.800 | 3.380 | 2.400 | 3.800 | 3.800 |
| Mean | 0.176 | 0.160 | 0.246 | 0.203 | 0.174 | 0.297 | 0.355 | 0.274 |
| Median | 0.130 | 0.080 | 0.200 | 0.160 | 0.140 | 0.230 | 0.300 | 0.220 |
| Geometric Mean | 0.107 | 0.083 | 0.188 | 0.148 | 0.130 | 0.212 | 0.282 | 0.214 |
| Standard Deviation | 0.187 | 0.205 | 0.187 | 0.203 | 0.153 | 0.244 | 0.253 | 0.220 |
| Coefficient of variation | 1.06 | 1.29 | 0.76 | 1.00 | 0.88 | 0.82 | 0.71 | 0.80 |
| Skewness | 4.15 | 2.99 | 2.17 | 5.50 | 1527.61 | 1.93 | 2.94 | 3.61 |
| Kurtosis | 42.53 | 16.86 | 12.51 | 58.53 | 0.88 | 9.37 | 20.16 | 30.44 |

| Table 14-3: Summary univariate statistics by doma | able 14-3: | : Summary | y univariate | statistics | by d | omair |
|---|------------|-----------|--------------|------------|------|-------|
|---|------------|-----------|--------------|------------|------|-------|

A boundary analysis was done to examine how the Cu grades change (gradationally or rapidly) across the Haib deposit. A challenge that existed in this exercise was the fact that the majority of the boreholes are close to vertical. This is effectively parallel to the maximum direction of grade continuity as determined from the directional semi-variograms. Boreholes that intersect this trend at a high angle are preferable, nevertheless, some of the Teck drilling was inclined. From these inclined boreholes,

87

holes representing various orientations and dips were selected and the Cu% grade was graphed against depth from collar. These are shown in Figure 14-3.

In Figure 14-3 it can be seen that in every instance there is a well-defined gradual change in grade at the large scale. Minor high-grade inflections do exist but these are highly localised and probably represent the intersection of mineralised veins or other structure. The trend is subtler in TCDH011 primarily because the background grades in this hole are low as it has been drilled on the periphery of the deposit. Though subtle, the pattern is still there and is evident between collar and ~150m depth below collar. In summary; no evidence exists from the boundary analysis of the existence of distinct highly mineralised and less mineralised zones. Grades increase and decrease gradually, with local variations (associated with minor structures).

The above confirms the mineralisation model which states that the mineralisation is spatially associated with syn-mineral dykes (QBP) as well as dark micaceous veins (XPBX). In addition, there is considerable vein development and disseminated mineralisation in the QFP and FP rocks as well. As, the imprint of mineralisation clearly crosses lithological contacts and structures, stationarity (a requirement for estimation) within the lithologies is somewhat lacking.



Figure 14-3: Boundary analysis of Cu grade from selected inclined boreholes drilled by Teck.

For the reasons above, the decision was taken to not apply any domaining based on lithology, structure or grade to the definition of the mineral resource for the Haib deposit. Boundaries would be managed based on proximity to data.

14.4 Statistical Analysis

14.4.1 Univariate Statistics

The univariate statistics for Cu and Mo are shown in Figure 14.4. Both populations are positively skewed, particularly the Mo grades. For Cu, the log histogram hints at two possible populations, the first around 0.008% (80ppm) and the second one at 0.18%. It is likely that this lower population represent some non-mineralised portions on the periphery of the Haib deposit. Multiple populations are also indicated for Mo in the log histogram at 5ppm, 10ppm and 20-30ppm.



Figure 14-4: Normal and log-histograms as well as summary statistics for all raw Cu and Mo grades.

14.4.2 Grade versus Sample Width

Due to the fact that grade is not strictly additive; the relationship between a sample grade and the width/volume/tonnage it represents is a very important consideration. In some deposits, clear relationships (positive or negative) exist between grade and sample width and in these instances, it is more correct to work with the grade

accumulation (grade x width or grade x volume etc.) than the actual grade. In this instance, the core diameter is assumed constant and a default density was to be applied so it made sense to only consider the grade and sample length relationship. A scatterplot of Cu and Mo grade versus sample length is shown in Figure 14-6.



Figure 14-5: Scatterplots for all raw samples comparing Cu and Mo grade to sample width.

It is clear from the figure above that there is no clear relationship between Cu grade and sample width which is confirmed by a correlation co-efficient of 0.013 (calculated but not shown). As the sample size has no obvious effect on the grade, it was decided to continue with the mineral resource estimation work using the Cu grades "as-is" and not accumulations. The same is true for the Mo grades and the same decision to work with Mo grades was taken.

14.4.3 Compositing

Within the portion of the prospecting area that had been modelled by Teck, the horizontal drill hole spacing closely approximates a grid of 150 x 150m. As most of the raw samples are between 1 and 2m wide, the vertical component of the sample spacing is very small relative to the horizontal components. Compositing is typically used to regularise the sample size to produce a standardised weight for each sample. However, in this instance, as the sample lengths are already fairly consistent it was decided to composite the samples to a more global scale better suited to the scale of open cast mining. A 10m composite length was selected to correlate with a typical bench height and 10m composites were calculated starting from the collar. Residual composites were retained.

The univariate statistics were then calculated for Cu% and Mo (ppm) and are presented in Figure 14-6 while the results are tabulated in Table 14-4. From Figure 14-6, it can be seen that the composite populations remain positively skewed. The multiple populations hinted at in the raw samples have been smoothed out in the composites. The Cu composites show a clear compound log normal distribution indicating due consideration must be given to anomalously low and high grades. The Mo shows a log normal distribution around a mean of 30ppm.



Figure 14-6: Histograms showing the distribution of the 10m composite Cu and Mo grades.

| Table 14-4: | Univariate | statistics | of the | 10m | composites |
|-------------|------------|------------|--------|-----|------------|
|-------------|------------|------------|--------|-----|------------|

| | Cu% | Mo (ppm) |
|----------------|--------|----------|
| Count | 6,947 | 5,851 |
| Minimum | 0.000 | 0.2 |
| Maximum | 1.748 | 963 |
| Mean | 0.176 | 43.1 |
| Median | 0.144 | 30 |
| Geometric Mean | 0.118 | 30 |
| Variance | 0.0226 | 2,639 |
| Std Deviation | 0.150 | 51.4 |
| CoV | 0.853 | 1.19 |
| Skewness | 2.089 | 6.099 |
| Kurtosis | 10.809 | 66.107 |

Smoothing of grade is a natural consequence of compositing and care should be taken to avoid smoothing out all the natural variation of the grade. Creating 10m composites from 1 to 2m samples is quite an aggressive approach so the impact of the compositing was assessed. This was done using Quantile-Quantile (QQ) Plots to compare the percentile distributions of the raw and composited data. These are given in Figure 14-7.



Figure 14-7: QQ Plots comparing the Cu and Mo grade distributions of the raw data against the derived 10m composites.

On a QQ Plot, one expects to see the curve cross the dashed 45° line at the median (red shaded point) or mean value (indication of bias) while the amount of rotation from the 45° line provides an assessment of the amount of smoothing that has occurred. From Figure 14-7, it can be seen that the effect of compositing on the Cu distribution is negligible and the composites reflect a similar variation to the original data. For Mo, the situation is a little more complex but is almost certainly the result of the visually estimated Mo grades discussed further in section 14.4.6. It should also be remembered that Mo is of secondary importance to Cu in this exercise.

14.4.4 Grade Capping

Grade capping analysis was done on the %Cu grades of the raw data as well as the 10m composites. The former in order to test the extent to which capping was required for the compositing while the latter was done to evaluate the risk of extreme assay values during estimation and whether it was necessary to limit their influence during the estimation process. Figure 14-8 shows a Top Cut Analysis for the raw Cu grades as well as the 10m composites. These were derived by applying an upper cap to the data and calculating the mean of the samples below the cap value (blue lines in Figure 14-8). The Lost Metal% effectively quantifies the amount of "metal" lost due to the exclusion of the grades above the cap (red lines in Figure 14-8). The graph provides a means to determine how sensitive the data are to the inclusion or the exclusion of the values above each cap value with the sensitivity being reflected in the gradient of the curve. For instance, between 0.1% and 0.4%, the application of each subsequent cap has a material influence on the resultant "metal". Above 0.4% this is more subdued.



"Lost metal is (Average – Averaged Capped)/Average " 100 where Average is the average grade of the composited assays before capping and Average Capped is the average grade of the composited assays after capping.

Figure 14-8: %Cu Top Cut Analysis for raw data and 10m composites

From Figure 14-8 it can be seen that;

- The respective curves for each of the raw data and composites are practically identical.
- For the raw data, beyond the 0.4% Cu cap value, there is very little change in the sample subset mean while the Lost Metal% effectively remains constant.
- The same is true for the 10m composites.
- For these reasons it was decided not to apply capping to the calculation of the 10m composites to be used in estimation.
- For the 10m composites, it is clear that the inclusion or exclusion of samples >0.7% will not have a material effect on the resultant contained "metal". However, it must be remembered that these are 10m composites and therefore they represent a significant volume i.e. to get a high-grade composite requires multiple high-grade samples. As it was felt that these high-grade composites actually carry the requisite support the decision was taken not to cap or cut these values during estimation. However, to avoid spurious smearing of the grades,

their range of influence during estimation was significantly reduced as described further in this text.

14.4.5 Mo – Analysed Grades versus Visual Estimates

To compensate for missing samples, some of the boreholes contain Mo grades that are based purely on analytical laboratory assays while for others the Mo grades are visual estimates. Visual estimates are subjective and their quality is a function of the skill and experience of the responsible geologist and can therefore result in biased datasets. In this instance, the assays represent some 9,324 samples while there are only 404 visual estimates, so the anticipated influence is small. The cumulative frequency distributions are presented in Figure 14-9.



Figure 14-9: Cumulative frequency curves comparing the grade distributions of analysed Mo grades and visual estimates.

From the figure above, the following is evident;

- The distribution of the visual estimates crosses that of the analyses in such a manner that the relatively more high-grade samples are offset by relatively more low grades. This is indicated by the areas between the blue and the red line.
- The distribution of All the Mo grades (visual estimate and analyses) is practically identical to that of the analyses. The visual estimates therefore do not materially bias the final compiled dataset.

A cautionary note is that the plot above does not consider sample length. The visual estimates are done for significantly larger intervals than the samples. If a 60m visual estimate is composited into six 10m samples, then this will impact the resultant cumulative frequency distribution. The effect of this is clearly demonstrated in the composite distributions in Figure 14-6 above for the Mo plots. While, it is expected that any positive bias will be offset by a negative effect, the Mo grades cannot be viewed at

the same level of confidence as the Cu grades and are essentially of secondary consideration in this exercise.

14.5 Variography

In order to detect any preferred directions of grade continuity, variography was conducted for Cu and Mo. This comprised linear semi-variograms to examine the Nugget Effect as well as omni-directional and directional experimental semivariograms. Anisotropy was determined and variogram models fitted for use in estimation by Ordinary Kriging.

14.5.1 Linear Semi-variograms

Experimental linear semi-variograms were generated down the hole using the raw data. As linear semi-variograms use the closest spaced samples they can provide a good indication of the degree of randomness (Nugget Effect) of a deposit. The experimental linear semi variograms and the derived variogram models are shown in Figure 14-10. The variograms are very robust and are supported by a large number of sample pairs. Both show double spherical structures with the first Range between 16 and 20m while the Cu shows a Range in excess of 500m. The model curves represent an initial relative rapid change in continuity to the first sill at which point the rate of change is more gradual. For Cu, the Nugget Effect is about 40% of the population variance while for Mo it is at 76%.



Figure 14-10: Experimental linear semi-variograms for Cu and Mo and the derived spherical models.

14.5.2 Omni-directional Semi-variograms

These quantify the rate of change of grade continuity only on the basis of distance without any considerations of anisotropy. Robust spherical variogram models were obtained for both parameters considered and are shown in Figure 14-11. In some instances, outliers were filtered out of the experimental variograms to reduce noise. Models were fitted in this space then back transformed to the original population space. The variogram models are summarised in Table 14-5.



Figure 14-11: Omni-directional semi-variograms for Cu and Mo and the derived spherical models.

Both elements considered could be modelled using a double spherical structure. The largest ranges were obtained for Cu at 1,215m and 560m for Mo. The Nugget for Cu is at \sim 30% of the population variance while Mo is 55%. All elements reach the first sill at similar levels relative to the population variance (79% - 88%).

| able 14-5: | Derived omni-directional variogram models for Cu and Mo k | | | | | | |
|------------|---|--|--|--|--|--|--|
| domain | | | | | | | |
| | | | | | | | |

| | Cu | Мо |
|--------------------|-----------|-----------|
| Model Type | Spherical | Spherical |
| Co | 657,477 | 1,448 |
| % of Var | 29% | 55% |
| Sill ₁ | 1,126,183 | 880 |
| Cum% of Var | 79% | 88% |
| Range₁ | 263 | 230 |
| Sill ₂ | 477,570 | 311 |
| Range ₂ | 1,215 | 560 |

14.5.3 Directional Semi-variograms

Although well supported omni-directional variogram models were obtained, one of the drawbacks of omni-directional variograms is that they can often obscure finer scaled details. Additionally, in this instance the mineralisation has a component of structural control with an association with veins and fractures. For these reasons, the presence of any existing potential preferred orientation of grade continuity was tested using directional semi-variograms.

The derived directional semi variogram models are shown in Figure 14-12. The maximum continuity is shown by the red lines while the subordinate anisotropy axes are indicated by the magenta and cyan lines. These show a general anisotropy where the semi-major axis has a Range of \sim 50% of the major axis and the minor about 25%.



Figure 14-12: Directional semi-variograms showing the "All Orientations" variogram models for 10m composites of Cu and Mo.

The variogram models are summarised in Table 14-6. For Cu, the model shows a double spherical structure with a maximum Range of just over 1,400m. Mo also shows a double spherical model structure with a maximum range just over 530m.

| | | Cu | Мо |
|------|------------------|-----------|-----------|
| | Model Type | Spherical | Spherical |
| | Co | 1,073,898 | 766 |
| | % of Var | 47% | 29% |
| | Sill1 | 744,247 | 505 |
| | Cum% of Var | 80% | 48% |
| | Range1 | 215 | 127 |
| | Sill2 | 443,085 | 1,369 |
| | Range2 | 1419.958 | 534.0 |
| Y | Plunge | 0.0 | 64.5 |
| do | Bearing | 134.7 | 207.1 |
| ot | Dip | 67.2 | -77.9 |
| nise | Major:semi-major | 1.87 | 1.24 |
| Ar | Major:minor | 4.15 | 3.36 |

Table 14-6: Derived variogram models and their associated anisotropycomponents for Cu and Mo

At this stage, the decision was made to use the directional variogram models for Cu in Table 14-6 further because they show a larger maximum Range than the omnidirectional variograms and the associated anisotropy was felt to be more representative of the Cu mineralisation. For Mo, the omni-directional variograms are more robust and as the directional and omni-directional show very similar maximum ranges, it was decided to use the omni-directional variogram provided above in Table 14-5.



Figure 14-13: Isometric view looking northwest showing the semi-variogram anisotropy for Cu.

The anisotropy ellipsoid for Cu is shown in Figure 14-13. Maximum grade continuity is oriented approximately horizontally along 135°. The semi-major dips towards 225° at about 67°.

14.6 Block Modelling

The general mine planning software, Geovia-GEMS from Dassault Systems was used for this work. GEMS make use of a Percent block model attribute and not sub-celling to manage and report volume accurately. The cell size used in the estimation in GEMS is therefore purely a function of the data spacing. For this work, it was felt that a full Quantitative Kriging Neighbourhood Analysis (QKNA) was un-warranted due to the fact that the drilling is relatively evenly spaced and the derived variogram models are robust and supported by a large number of sample pairs. Any gains from the QKNA are likely to be minor and wouldn't be substantiated by the amount of work required.

Instead, a horizontal cell size of $75m \times 75m$ was used as the drill holes are spaced on a grid with a general spacing of $150m \times 150m$. A cell height of 10m was selected.

The block model project was positioned over the main target area on which the $150m \times 150m$ pattern had been drilled and sized appropriately to cover the full extent of the drilling with depth. The geometrical definitions are given in Table 14-7.

| Ē | Х | 780,140 |
|---------|-------------|-----------|
| rig | Y | 6,821,810 |
| 0 | Z | 650 |
| | Column | 75 |
| Cel | Row | 75 |
| 00, | Level | 10 |
| of s | Columns | 39 |
| o. o | Rows | 31 |
| N | Level | 115 |
| ţ | X Direction | 2,925 |
| bus | Y Direction | 2,325 |
| Le | Z Direction | 1,150 |

Table 14-7: Block model geometrical definitions

14.7 Specific Gravity

Limited specific gravity (SG) determinations were done by Teck on core from boreholes TCDH014 up to and including TCDH027 (excluding TCDH025). A total of 99 SG determinations were available for this work. Figure 14-14 shows a normal histogram of these along with the summary statistics. The distribution is quite normal with the mean and median values being identical at 2.76 T/m^3 . Values range between a low of 2.23 and a high of 3.01 T/m^3 .



Figure 14-14: Normal histogram of available specific gravity determinations

As there were not enough determinations to allow for interpolation of the SG for the Haib deposit, it was decided to apply a default SG of 2.8 tonnes/m³ to the Haib mineral resources. This figure was derived by rounding the mean SG of 2.76 to one decimal place. It is the author's opinion that this is a perfectly reasonable approach considering the low variability of the SG's determined for the Haib deposit.

14.8 Estimation

Ordinary kriging was used to estimate Cu and Mo in a stepwise fashion as follows;

- A first pass kriging run was done using a search ellipse matched to the Ranges of the semi-variogram models. Cells estimated during the first pass were tagged with an integer value of 1.
- The search ellipsoid Ranges were then doubled, the minimum and maximum number of samples adjusted and a 2nd kriging run was done. Cells populated were tagged with the value 2. In both instances, all cells were estimated within a search of 2x the Range.
- An ellipsoidal search was used for both Cu and Mo.
- No high-grade limits were used. Instead a high-grade transition (HGT) value for Cu was defined at 1%. Cu grades above this value were used "as-is" but the range of influence for these was reduced significantly.

A summary of the kriging run inputs is given in Table 14-8.

Table 14-8: Summary of the kriging inputs for each of the runs completedfor Cu and Mo.

| | | Cu | Мо |
|-------|-----------------------------|---------------|-------------|
| Run 1 | Search | RANGE | RANGE |
| | Minimum Samples | 10 | 10 |
| | Maximum Samples | 18 | 18 |
| | Discretisation | 10x10x5 | 10x10x5 |
| | Search Type | Ellipsoidal | Ellipsoidal |
| | High Grade Transition (HGT) | 1% | 128 |
| | Range for >HGT | 700; 380; 170 | 50; 50; 50 |
| | No. of Cells Estimated | 108,758 | 90,229 |
| | Estimates Cells as % | >99% | 83% |
| Run 2 | Search | RANGEx2 | RANGEx2 |
| | Minimum Samples | 12 | 16 |
| | Maximum Samples | 24 | 20 |
| | Discretisation | 10x10x5 | 10x10x5 |
| | Search Type | Ellipsoidal | Ellipsoidal |
| | High Grade Transition (HGT) | 1% | 128 |
| | Range for >HGT | 700; 380; 170 | 50; 50; 50 |
| | No. of Cells Estimated | 108,758 | 18,427 |
| | Estimates Cells as % | <1% | 17% |

During kriging, various outputs such as kriging variance, kriging efficiency, slope of regression, number of samples, number of negative weights and others were tracked and used as a guide in the estimation process.

14.9 Estimate Validation

During kriging, various parameters were tracked and trace blocks were used in regions of high, medium and low data support. Post-estimation, visual inspection was used along with more quantitative methods such as;

- Non-spatial comparison of source data and estimates using QQ Plots
- Swath lots were generated to compare trends in the data with estimates
- Comparison of estimates and average grades of informed cells as well as estimation methodologies

14.9.1 QQ Plots

The Quantile-Quantile Plots comparing the percentile distributions of the 10m composite source data to the estimates are shown in Figure 14-15. Smoothing is a consequence of estimation and as expected is reflected by the rotation of the curves from the dashed 45° line. For Cu the estimate distribution is lower grade than that of the source data. This is probably due to the fact that the domain extends beyond the data limits (particularly with depth). In these areas, grades are lower but also a lot of cells will be populated by only a portion of the source data. As the QQ Plot is non-

spatial, it cannot really account for this. Nevertheless, the fact that the estimates are slightly lower grade does imply a more conservative result and it is the opinion of the author that these results are a reasonable representation of the source data.



Figure 14-15: QQ Plots comparing the grade distributions of the source composite data and the estimates.

14.9.2 Swath Plots

Swath plots involve the aggregation and calculation of average grades of samples and estimates along pre-defined corridors orientated along the X, Y and Z axes of the block model. As they are aggregations, they are used to test whether data trends are reflected in the estimates e.g. Areas with high grade samples are associated with high grade estimate values. The generated swath plots for Cu are shown in Figure 14-15 where it can be clearly seen that the estimate and data trends show good correlation.



Figure 14-16: Swath plots showing trends in source 10m composites and the estimates of Cu.

14.9.3 Comparison of Estimates and Informed Cells and Methodology

An inverse distance squared estimate (" $ID^{2''}$) was prepared for the blocks using the same search criteria used for ordinary kriging ("OK'') and the results were compared to the OK estimate. In addition, the average composite sample grades for all blocks containing composite samples (informed blocks) were compared to the OK and ID^{2} estimates using scatter plots. These scatter plots are shown in Figures 14-17.



Figure 14-17: Scatterplots comparing Ordinary Kriging estimates to Inverse Distance² and Ordinary Kriging estimates to informed cell averages

In Figure 14-17 it can be seen that for Cu there is good correlation between the OK estimates and average grades of informed cells ($R^2 = 0.964$). The same is true for the OK and ID² estimates as reflected in the R^2 of 0.972.

For Mo grades above 80ppm (~p90) the OK estimates are higher than the average grade of the informed cells while relative to the ID^2 estimates, the OK results are lower at Mo grades >80ppm. The reasons for this are not fully understood however with R^2 values exceeding >0.9 the correlations are still reasonable.

14.10 Block Model Sensitivity Analysis

The tonnage and grades of the Haib deposit calculated here are a direct function of the cut-off grade used for reporting. To illustrate this, the block model quantities and grade estimates within the total block model are presented in Table 14.9 at different cut-off grades. The reader is cautioned that the figures presented in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of cut-off grade and the associated grades and tonnages.

| Cu% Cut-off | Million Tonnes | Cu% | Mo(ppm) |
|-------------|----------------|------|---------|
| ≥0.60 | 2.4 | 0.64 | 55 |
| ≥0.55 | 5.0 | 0.60 | 49 |
| ≥0.50 | 9.1 | 0.57 | 53 |
| ≥0.45 | 20.4 | 0.51 | 56 |
| ≥0.40 | 46.7 | 0.46 | 63 |
| ≥0.35 | 137.0 | 0.40 | 59 |
| ≥0.30 | 334.9 | 0.35 | 55 |
| ≥0.25 | 1,067.2 | 0.29 | 53 |
| ≥0.20 | 2,196.6 | 0.26 | 48 |
| ≥0.15 | 4,156.1 | 0.22 | 42 |
| ≥0.10 | 8,198.0 | 0.17 | 37 |
| Total | 15,736.0 | 0.12 | 33 |

Table 14-9: Block model quantities and grades at the specified Cu% cut-offs

* The reader is cautioned that the figures in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the block model estimates to the selection of cut-off grade.

From Table 14-9 it can be seen that as the Cu% cut-off is increased in increments of 0.05% from 0.10% to 0.25%, the tonnage is effectively halved. Between 0.25% and 0.30% the tonnage is reduced by two thirds and this rate continues until 0.40% after which the rate of drop returns to a halving. The grade tonnage curve associated with Table 14-9 is shown in Figure 14-18.



Figure 14-18: Grade tonnage curve for the Haib deposit.

14.11 Mineral Resource Classification

The mineral resource estimates presented here have been classified according to the guidelines of the Canadian National Instrument 43-101 by Dean Richards of Obsidian Consulting Services, who is an appropriate Qualified Person as defined by the instrument. The definitions applied from the code were as follows;

Mineral Resource

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are <u>reasonable</u> <u>prospects for eventual economic extraction</u>.

The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

Inferred Mineral Resource

An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

Indicated Mineral Resource

An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

Measured Mineral Resource

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

The types of data, data density and the data density for Haib are such that they provide a good basis for the confident interpretation of the geology and mineralisation constraints of the Haib deposit. The drill hole spacing and the quantity of data has allowed the grade continuity to be well defined at distances much smaller than the Ranges expressed by the variography. While a significant portion of the data was not subjected to an international standard Quality Assurance and Quality Control programme, the most recent work completed by Teck was significant and as it sampled largely the same domain as the historical work, it provides a means of establishing the quality of the historic data. These show that the Cu distributions of the historic data and that of Teck are practically identical.

With respect to the Mo grades reported here, they do not provide the confidence levels that the Cu grades do and the resource classification is based purely on the Cu grade.

Under the considerations above, the following classification has been applied. No Measured Mineral Resources can be declared for Haib at this stage. From topography to an elevation of 75m above mean sea level (amsl), the data density across most of the estimated resource is high being associated with a drill grid approximating 150m x 150m. This spacing is substantially smaller than Ranges obtained for Cu both from linear and directional semi-variograms and thus the portion of the mineral resource supported by this data density to an elevation of 75m amsl is classified as Indicated Mineral Resources.



Figure 14-19: Isometric and sectional views showing the distribution of drill hole data and the applied mineral resource classification.

On the periphery of the 150m x 150m grid, along the northern and eastern edge of the deposit, the data density increases to a grid approximating $300m \times 150m$ with holes drilled to 75m amsl. This portion has been classified as an Inferred Mineral Resource and extends eastwards to the edge of the estimated volume. This extension is supported by the fact that there is a line of boreholes in this area (Inferred isometric view in Figure 14-19) that are spaced within the maximum variogram Range Cu.

Below 75m amsl, the number of holes drilled deeper decreases rapidly. 11 boreholes are drilled to an elevation of -150m amsl while 6 of these are drilled even deeper to - 350m amsl (Figure 14-19). Using an area of influence of 250m approximating the short Range spherical structure seen in the Cu variogram, areas of influence were created around these data points at -150m amsl and -350m amsl. The resulting volume is classified as Inferred Mineral Resources.

The fact that data density has been used primarily as the basis for the mineral resource classification is clearly illustrated in Figure 14-19 above. As a supplementary exercise, the Slope of Regression and Kriging Efficiency parameters generated for Cu during the ordinary kriging were cross referenced to the mineral resource classification.

This showed that within the Indicated Mineral Resources, the average Slope of Regression is 0.85 (target 1) while the Kriging Efficiencies are positive and average 76% (target +100%). For the Inferred Mineral Resources, the average Slope of Regression is 0.56 (target 1) while the Kriging Efficiencies are positive and average 46% (target +100%). Although not the basis for the Mineral Resource Classification, they do confirm that the classification applied is reasonable. Furthermore, it is the

author's opinion that the Indicated Mineral Resources are suitable for use in a Pre-Feasibility level study.

14.12 Mineral Resource Statement

CIM Definition Standards for Mineral Resources and Mineral Reserves (December 2005) defines a mineral resource as:

"A concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge".

The "reasonable prospects for economic extraction" requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the mineral resources are reported at an appropriate cut-off grade taking into account extraction scenarios and processing recoveries. In our opinion, and assuming the current copper prices are maintained, there is a reasonable prospect for economic extraction and we therefore assume that at a cut-off grade of 0,25% all the processing options will show positive economic results and for this reason, a cut-off grade of $\geq 0.25\%$ Cu has been applied in the compilation of the Haib Mineral Resources Statement presented in Table 14-10. It must be highlighted again that the confidence in the reported Mo grades is significantly lower than Cu and only the Cu grades have been used in the classification. The Mo grades reported in Table 14-10 are provided for illustrative reasons only.

Table 14-10: In situ classified mineral resources of the Haib Project at a0.25% Cu cut-off grade.

| Resource Class | Volume (xMillion m ³⁾ | Density | xMillion Tonnes | Cu(%) | Mo(ppm) | | |
|--|-------------------------------------|---------|--------------------|-------|---------|--|--|
| Measured | - | - | - | - | - | | |
| Indicated | 163.2 | 2.8 | 456.9 | 0.31 | 46 | | |
| M+I | 163.2 | 2.8 | 456.9 | 0.31 | 46 | | |
| | | | | | | | |
| Inferred | 122.3 | 2.8 | 342.4 | 0.29 | 61 | | |
| Rounding has been applied as appropriate to reflect limits of precision and accuracy | | | | | | | |
| %Cu Cut-off | Volume (xMillion m ³) | Density | xMillion Tonnes | Cu (%) |
|-------------|--------------------------------------|---------|--------------------|-----------|
| 0.20% | 323.2 | 2.8 | 904.8 | 0.27 |
| 0.25% | 163.2 | 2.8 | 456.9 | 0.31 |
| 0.30% | 78.5 | 2.8 | 219.8 | 0.36 |

Table 14-11 : Haib Copper Indicated Mineral Resources, Sensitivity Cases.

 Table 14-12: Haib Copper Inferred Mineral Resources, Sensitivity Cases.

| %Cu Cut-off | Volume (xMillion m ³) | Density | xMillion Tonnes | Cu (%) |
|-------------|--------------------------------------|---------|--------------------|-----------|
| 0.20% | 245.1 | 2.8 | 686.2 | 0.26 |
| 0.25% | 122.3 | 2.8 | 342.4 | 0.29 |
| 0.30% | 39.2 | 2.8 | 109.8 | 0.34 |

14.13 Areas of Uncertainty that may impact the Estimates

Areas of uncertainty that may materially impact the Mineral Resource estimates include:

- A change in Cut-off grades due to changes in Cu pricing and other economic factors.
- Drill spacing The drill spacing and depth of drillholes at the Haib deposit is insufficient to determine the full extent of the mineralization. The drill spacing proves to be too large to accurately represent grade variations at the smaller scales required for short term planning and scheduling of mining operations.
- The Mo grades are largely based on estimates during logging and not on assay data, so little reliance should be put on the quoted Mo resources.
- If the SG's of the deposit display significantly greater variation than indicated by the limited data set of SG determinations, there is a risk that the conversion of Volume to Tonnage may be inaccurate.
- Commodity prices and exchange rates may materially affect project feasibility.
- Assumptions used in the PEA to generate the data for consideration of feasibility of mining the Haib deposit, such as mining costs, both Capital and Operating, extraction and recovery of Cu and Mo, infrastructure development costs, availability of water, electric power and rail transport.

- Unusual weather phenomena, government regulation changes, governmental failure to provide adequate infrastructure may have material effects on the feasibility of the project.
- The project will require additional approvals, permits and licences in order to begin mining operations and these may be delayed or not granted.
- The Haib project will require substantial additional financing in the future and HM cannot be certain that such financing will be available.
- Any revocation, dispute or challenge to HM's mineral title may have a severe effect on project feasibility.
- Labour disruptions and increased labour costs could have a material effect on feasibility of the project.
- Namibia is a democratic, capitalist country. However, there is a political risk factor which could affect the feasibility of the project and the enforceability of HM's rights. The Fraser Institute Survey of Mining Jurisdictions in 2016 ⁽⁵³⁾ reported Namibia's score and their rank deteriorated for the second straight year. In 2014, Namibia was ranked as the 19th most attractive jurisdiction in the world when only policies were considered. The country fell to 29th in 2015 and dropped again to rank 38th in 2016. After this decline, Namibia no longer ranks as the second most attractive jurisdiction in Africa based on policy. In 2016 miners expressed increased concern over uncertainty regarding the administration, interpretation, or enforcement of existing regulations (+28 points), the taxation regime (+21 points), and trade barriers (+19 points). Namibia now ranks 9th out of 18 African mining jurisdictions.

15. ADJACENT PROPERTIES

There are several large properties currently held by other exploration companies that completely surround the Haib property. These are shown in Figure 15-1 below, which is a map extract from the Namibian Department of Mines and Energy ⁽⁸⁾ website. As far as I am aware, no comprehensive exploration programme for copper or base metal mineralisation has been reported on any of these properties despite historically reported visible surface indications of oxide copper, particularly to the southeast and east of Haib in Haib Volcanics and Vioolsdrif Intrusives. The larger, adjacent EPL's are tabulated below: -

•

| EPL No. | | |
|-------------------|----------|---|
| | Owner | Namibia Hua Yan Resources Explo & Devel Pty Ltd |
| | Tel. No. | +264-61-220465 |
| 5327 | Minerals | Industrial Minerals & Precious Stones |
| 36 540ha | Granted | 29-10-2013 expired 28-10-16 renewal pending |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Desiree Rosilene Davids |
| 5704 | Tel. No. | +264 81 149 0504 |
| 10 257 Cha | Minerals | Precious Stones |
| 10 357.011a | Granted | 28 January 2015 to 27 January 2018 |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Walenga, John |
| | Tel. No. | +264-61-262572 |
| 4182 | Minerals | Base metals; rare metals; industrial minerals; precious metals; phosphate |
| 44 819na | Granted | 17-6-2014 renewal pending |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Trevor James Rhode |
| | Tel. No. | +264 61 400 406 |
| 5187 | Minerals | Precious Stones |
| 9 369.6ha | Granted | 19 November 2014 – 18 November 2017 Renewal pending |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Giant Mineral Namibia cc |
| E702 | Tel. No. | +264-81-244777 |
| 2783 44 492 ha | Minerals | Base metals; rare metals; industrial minerals, nuclear fuels, phosphates. |
| | Granted | 30 Sep 2014 application pending |
| | Region | Karas |

| Table 15-1. List of Properties and Ow | vners Adjacent to the Haib I | Property ⁽⁸⁾ |
|---------------------------------------|------------------------------|-------------------------|
|---------------------------------------|------------------------------|-------------------------|

| | District | Karasburg |
|------------|----------|--|
| | Owner | Gemco Investments cc |
| 6406 | Tel. No. | +264 81 222 3445 |
| 6406 | Minerals | Precious Stones |
| 19 378.4ha | Granted | 14 July 2017 – 13 July 2020 |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Mickal Ngajozikue Tjituka |
| | Tel. No. | +264 61 26 2597 |
| 5804 | Minerals | Base & Rare Minerals & Precious Stones |
| 3 741.7ha | Granted | 3 June 2015-2 June 2018 |
| | Region | Karas |
| | District | Karasburg |
| | Owner | Erikki Kanukwatange |
| | Tel. No. | +264 81 242 4348 |
| 6415 | Minerals | Base & Rare Minerals & Precious Stones |
| 2,784.5ha | Granted | 27 June 2017-26 June 2020 |
| | Region | Karas |
| | District | Karasburg |

N.B. The above licence details were correct at the date on the DME website of 4th December 2017.

Please note that EPL 5327 overlies the HM property EPL 3140 and has been granted for Industrial Minerals and Precious Stones. As far as the HM management and Directors know, there has been no exploration on this EPL (5327) and their application for renewal dated 28th September 2016 is still pending.

The remaining adjacent properties do not conflict in any way with the activities of HM.



Figure 15-1: Location of Adjacent EPL's: A map, updated on 4 December 2017, extracted from the Department of Mines and Energy website⁽⁸⁾ showing EPL 3140 (the Haib – outlined in red) and adjacent properties.

16. OTHER RELEVANT DATA AND INFORMATION

16.1 General

Subsequent to the BD historic tonnage / grade estimation, NCJV completed a significant amount of work that was not reviewed by BD but does contribute significantly to the Haib knowledge base. This information will not be reviewed in detail here, however, a description and summary of this data is merited as it indicates the potential for future development of the Haib. Most of this data is available in the form of written reports and maps, some of which are available in electronic format.

Some of the additional data includes: -

- Data from the underground development of the adit. This involved some 150 metres of underground development of an adit at a nominal 2 x 2 metre cross-section with two short cross-cuts at the end of the adit (see photograph 2). This adit and cross-cut generated some 2,000 tonnes of fresh material for metallurgical test-work. The adit intersected higher grade material delineated by RTZ's close-spaced drilling on section 000E/W;
- Of the 2,000 tonnes of rock removed from the adit some 500 tonnes was sent to various laboratories for test-work. The balance is still stockpiled on site (see photograph 8);
- Geological mapping and sampling of the adit was carried out coincident with mining. Two sets of samples were collected for assay – the first being a sludge sample from the blast hole drilling, and the second being sidewall channel sampling. Assay samples were sent to the Scientific Services commercial laboratory in Cape Town, South Africa, and assayed for Cu oxide, Cu total, gold, silver, molybdenum, manganese and sulphur. The results of these analyses are available;
- Detailed surface geological mapping and drillhole re-logging was carried out. This
 included mapping of the Haib deposit and environs and the potential tailings site.
 This mapping included a geological re-logging of many of the old drillhole cores
 so that a geological model was developed. Much of this data is available. In
 addition, nearly all of the old RTZ and NCJV drill cores are still available on site
 at Haib (see photographs 3 and 4);
- 12 NQ drillholes were drilled by NCJV, totalling 4,306 metres. This programme was designed to complete in-fill drilling on the RTZ grid and to obtain some selective closer spaced drilling in the higher grade western end of the deposit;
- 5 x T2-101 large diameter holes, similar to PQ-size, were drilled totalling 627 metres; the drilling aimed at obtaining whole core samples of specific rock types for geotechnical testing. Existing NQ holes were twinned so that these rock types could be confidently sampled. These drillholes were also used to test grade variability over short distances. Analyses were as for the adit samples. Geotechnical logs were produced;

- An extensive structural mapping programme was carried out as a component of the open pit design. This study concentrated on the mineralised area and in part on areas where major infrastructure was to be located; this data is on record and available; and
- The area was flown for the production of ortho-photos and surface topographic maps at 1:10,000 scale over the mine site and 1: 30,000 scale over the entire prospecting licence area. Both ortho-photos and surface topographic maps are available. The ortho-photos were used by Teck geologists in their detailed geology mapping campaigns.

16.2 QP's Comment

Although the metallurgical testing and all of the environmental and rock competency tests and studies undertaken by the NCJV are still valid and are being used in the METS Preliminary Economic Assessment study, further bench-scale metallurgical work, geotechnical work prior to mine planning as well as assessments of infrastructure are required before further feasibility studies can be completed.

17. INTERPRETATION AND CONCLUSIONS

17.1 General Conclusions

The Haib mineralisation is undoubtedly a classic porphyry copper system and is probably one of the oldest known, preserved, porphyry deposits in the world ⁽⁵¹⁾.

Historical exploration work showed that the Haib project has large but low-grade copper mineralisation.

Teck's exploration results from the geological mapping, stream and soil sampling, geophysical survey and core drilling programmes to date contribute positively towards achieving HM's objective of providing a better understanding of the controls on high grade sections of the main Haib mineralised body and the nature of the satellite anomalies proximal to the main Haib body.

The deposit has been the subject of a new Resource Estimate using the results of historical drilling and also the newer Teck drilling and this study estimates that the Haib deposit has, using a 0,25% Cu cut-off grade, an in situ Indicated Resource of 457 million tonnes at an average grade of 0,31% Cu and an Inferred Resource of 342 million tonnes at an average grade of 0,29% Cu.

The Directors and majority shareholders of DSM and their wholly owned subsidiary HM are positive about the further development of the project and have commissioned a Preliminary Economic Assessment in order to show economic merit in development of the project towards full feasibility.

17.2 Significant Risks and Uncertainties

In addition to those outlined under Section 14 (Mineral Resource Estimates) the following significant risks and uncertainties can reasonably be expected to affect the reliability or confidence in the exploration information, mineral resource estimates and projected economic outcomes: -

• The risk that mineral rights may be cancelled for non-compliance with the conditions of grant. The exploration and surface rights held by HM are valid and HM have taken the appropriate steps in regard to meeting exploration spending commitments to ensure renewal of these rights at each renewal deadline ⁽⁴⁰⁾. I have relied for this conclusion on the certificates and a legal opinion letter ⁽⁴⁹⁾ (see Appendices 1, 2 & 3) ^(42 & 50). The Directors have provided me with a written assurance ⁽⁵⁴⁾ that they are fully aware of their future obligations to report progress and abide by the agreed work programme within the time frames as per the Mining Act and as agreed with the Ministry of Mines and Energy in their acceptance of the conditions of grant. The Directors also assure me that there are no past or current disputes in relation to their legal title.

• The uncertainties regarding availability of existing infrastructure such as electric power, water, access routes, availability of trained personnel, transport and communications facilities. The location and proximity to existing, functioning infrastructure is highly favourable not only for exploration but also for further development of the property to a mining stage. In this regard, the availability of sufficient space for mining operations, processing plant, tailings and waste dump sites, heap leach pads and the highest and best use of the land as a mining property are positive factors.

• The geological understanding of the settings, lithologies and mineralisation controls for the target deposit type and knowledge of the regional geology is well enough understood to inform pre-feasibility study exploration programmes. It is the intention of HM to conduct further drilling for metallurgical and geo-technical purposes as and when required.

• The sampling methods employed by Teck meet or exceed industry standard best practice and the quality of both the exploration geochemical and drill core assay data is reliable and performed in accordance with exploration best practices and industry standards. The lack of historical drill assay certificates and QA / QC of the RTZ assay data may mean that HM will need to verify further RTZ drill core by an expanded re-assay programme; unless there is a large, verified assay database the risk of inaccurate estimation of grades for resource / reserve purposes is greatly increased. The over-estimation of grades by RTZ as shown by check assays completed to date are possibly caused by total Cu dissolution assay methods used by RTZ.

• Infill core drilling may be necessary where there are significant gaps in the model's database.

• There is a risk that resource estimates followed by economic studies may show that the project is not economic at lower copper prices and this may result in project failure.

• The political, economic, commodity market and technical risks and uncertainties which may affect the successful development of the property are adequately known and understood but future changes may impact substantially, in either positive or negative ways.

17.3 QP's Comments

In my opinion, HM is exploring a large volume porphyry copper deposit situated in an ideal location adjacent to modern infrastructure which has the potential to become a large copper resource. There already exists a significant body of technical data concerning the Haib mineralisation and the period between resource estimation, pre-feasibility and definitive feasibility studies could be relatively short.

18. RECOMMENDATIONS

18.1 General

DSM has ownership of a significant, although highly challenging project in the Haib deposit which could rapidly progress to a feasibility study with a great deal of the investigative work already completed.

Teck Namibia correctly saw: -

- that the potential discovery of a satellite orebody could both increase the in-situ tonnage and provide a higher-grade zone that would help alleviate high initial CAPEX costs and,
- that the drill programme should also continue to investigate the potential highergrade zones within the main Haib orebody.

These programmes have been continued for the last several years and were very successful in identifying satellite orebodies to the Haib and redefining the mineralization within the Haib main orebody. Unfortunately, to date, the satellite body exploration programme has not developed significant additional higher-grade zones.

The Teck geological mapping of the higher-grade zones indicated that these were insufficiently defined by the vertical RTZ drilling since many geological features controlling the distribution of mineralisation are sub-vertical meaning that some of the more important/ significant mineralized zones were under sampled. This suggests that there is an imperative to complete more infill drilling in the higher-grade zone identified by the new Resource modelling.

18.2 Recommended Exploration Programme

DSM has used both the historical RTZ and Teck data and models to provide a new Resource Estimate and has commissioned a further study of processing methods to inform a Preliminary Economic Assessment. These will lead to further more detailed studies to bring the project to a feasibility study stage.

The DSM focus will therefore be toward the development and mining of a sound geological resource based upon realistic ore grades to be found within the main Haib orebody.

This programme was proposed and accepted by the Namibian Ministry of Mines and Energy and forms part of the documentation submitted in support of the renewal of the EPL for the period April 2017 to April 2019.

All phases of the programme will be results driven; for example, areas that may lack data in the 3-D model may require additional drilling and assaying with further resource estimation to drive decision making for mine planning and economic studies. The future budgets are therefore preliminary and may be changed at any stage, however the total actual expenditure during the renewal period must equal or exceed 80% of the total budgeted commitment in order for further renewals of the EPL to be granted.

DSM estimates that this proposed exploration programme $^{(48)}$ will cost some N\$8 million (currently equivalent to some C\$ 800,000) (see Table 18-1 below).

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Table 18-1: - Summary of Estimated Programme Costs for the period April2017 to April 2019.

| Item | Cost (US\$) |
|--|--------------|
| Computer Modelling & Resource Estimation | 40,000 |
| Metallurgy & Process Technology & Economic Investigation (PEA) | 60,000 |
| Drilling (4000 metres HQ diameter) | 500,000 |
| Miscellaneous (supervision, accommodation, etc) | 25,000 |
| Total | US\$ 625,000 |

This is currently (22nd December 2017) equivalent to **C\$ 800,000 or N\$8,000,000**.

18.3 QP's Comment

In my opinion this programme has real merit as it provides the most direct route to obtaining an early project decision point after a Preliminary Economic Assessment and it is therefore recommended that DSM proceed with the proposed programme as outlined in the above budget ^(35, 48). As stated in section 17 above, once the project advances to detailed economic studies, the HM Directors should extend the RTZ reassay programme in order to incorporate verifiable assay data into their geological model prior to the production of a final compliant resource estimate and feasibility studies.

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QUALIFIED PERSON CERTIFICATE

I, Peter W.A. Walker, B.Sc. (Hons) Geology, M.B.A., Pr. Sci. Nat., as the principal author of this report titled "Independent Technical Review and Resource Estimate - The Haib Copper Porphyry Project, Namibia" with a report date of 22nd December 2017, do hereby certify that:

1. I am an independent Consulting Geologist conducting work under the auspices of P&E Walker Consultancy cc of 41 Dennekamp, Main Road, Kenilworth 7708. Republic of South Africa. Tel: +27 (21) 762 1915 Cell: +27 (72) 411 1108 e-mail: <u>elipet@mweb.co.za</u>

2. I graduated with a Bachelor of Science (Hons.) degree in Geology in 1972 and an MBA in 1982, both from the University of Cape Town, South Africa.

3. I am a Professional Geologist registered with the South African Council for Natural Scientific Professions, registration No.400064/99;

4. I have worked as a geologist for a total of 40 years since my graduation from university. My relevant experience for the purposes of this Technical Report is:

- Seven years (1971 1978) as an exploration geologist in South Africa engaged in the mapping, drilling and evaluation of base metal deposits.
- Five years (1978 1982) as an exploration geologist in South Africa engaged in the exploration for Uranium and Tungsten deposits. During this period, I had mine visits to Climax Molybdenum mine amongst others in the USA, Australia, Canada and Brazil and also worked for three years on the discovery and evaluation of the Riviera porphyry Tungsten – Molybdenum deposit in the South-Western Cape, South Africa.
- Six years (1989 1995) as a senior exploration geologist in Namibia in the exploration, drilling and evaluation of gold and base metal deposits.
- Seven years (1995 2002) as exploration manager for first Trans Hex International Ltd and then Group exploration manager for Trans Hex Group, engaged in the valuation and assessment of new alluvial and kimberlite diamond projects, their exploration and management through to production.
- Three years as an independent, sole practitioner consultant (2002 2004) advising and writing competent person reports for exploration & mining companies.
- Thirteen years (2004 present) as Principal of P&E Walker Consultancy cc, an independent geological consulting closed corporation engaged in advising and writing competent person reports for exploration and mining companies.
- 5. I have read the definition of a "Qualified Person" as set out in NI 43-101 as amended on June 30 2011, and certify that by reason of my education, 40-years of experience in exploration geology, mining, and affiliation with a professional

association I fulfill the requirements to be a "Qualified Person" for the purpose of preparing this Report.

6. I am responsible for Sections 1 to 11, 13 & 15 to 18 of this independent technical review report.

7. I visited the Haib Project site described in this report on various occasions between 1989 and 1995 on Geological Society of Namibia field excursions and more recently on the 24th January 2012 and on the 30th June 2015. I have had no previous involvement with the Haib property.

8. As of the date of this certificate, to the best of my knowledge, information and belief, the report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

9. In terms of section 1.5 of NI 43-101 "Standards of Disclosure for Mineral Properties" I am independent of the commissioning entities, being the Issuer, Deep-South Resources Inc, and its subsidiaries and associates Deep South Mining Company (Pty) Ltd and Haib Minerals (Pty) Ltd applying all of the standard tests of independence; P&E Walker Consultancy cc is also independent of the commissioning entities, their directors, senior management and advisors.

10. I have read NI 43-101 as amended on June 30, 2011 and confirm that this Technical Review Report has been prepared in compliance with the Standards and Guidelines as set out in that document.

P.W.A. WALKER B.Sc. (Hons.) MBA Pr. Sci. Nat. FSEG MSAGS MGSN. Dated: 22nd December 2017.



QUALIFIED PERSON CERTIFICATE

I, Dean Sean Richards, B.Sc. (Hons) Geology, Pr. Sci. Nat., as a contributor to this report titled "Independent Technical Review and Resource Estimate – The Haib Copper Porphyry Project, Namibia" (the "Report") with a report date of 22nd December 2017, do hereby certify that:

1. I am an independent consulting geologist operating under the auspices of Obsidian Consulting Services cc, located at 46 Hamilton Ave., Craighall Park, 2196, Johannesburg, Republic of South Africa. Tel: +27 (11) 268 5772 Cell: +27 (82) 322 2466 e-mail: deanr@obsidianconsulting.co.za.

2. I graduated with a Bachelor of Science (Hons.) degree in Geology in 1991 from the University of Natal, Durban in South Africa.

3. I am a practicing professional geologist with 26 years of relevant experience and am registered with the South African Council for Natural Scientific Professions (reg. 400190/08) and a member of the Geological Society of South Africa.

4. I was responsible for the compilation of Sub-section 12.3 (Assessment of Quality Control Data) and Section 14 (Mineral Resource Estimate) of the Report.

5. I am a Qualified Person for these as that term is defined in the National Instrument 43-101 on the basis of the following relevant experience;

- Seven years (1992 1998) as an exploration geologist in South Africa engaged in mapping, drilling, logging, modelling and estimation of ferrous, base and industrial minerals projects.
- Eight years (1998 2006) as Technical Services Director of Gemcom Africa (Pty) Ltd responsible for Competent Persons Reports, 3D modelling, resource estimation, mine design and mine planning studies for diamond, precious metal, ferrous and base metal mines and exploration projects. Of particular relevance are:
 - Konkola Deeps Project, Konkola Copper Mines (KCM) in Zambia
 - Palabora Mining Company, South Africa
 - Dundee Precious Metals' Chelopech Mine, Bulgaria
 - o Chuquicamata Copper Mine, Chile
 - Selebi-Phikwe, Botswana
- Eleven years (2006 present) as the principal of Obsidian Consulting Services cc, an independent geological consulting company providing services to various mining and exploration companies around the world in the form of competent persons' reports, technical audits, planning and executing exploration programmes as well as advisory services. Apart from an audit for Volcan

Minera's Cerro de Pasco mine in Peru, for 11 years I have been a contributor and signatory to the Glencore Alloys annual mineral resource and reserve statements for the chrome, vanadium and platinum operations in South Africa. Since 2014 I have been advising and serving as a Competent Person to a Bulgarian exploration company (non-disclosure agreements prevent me from releasing the clients name without their written consent) with extensive base metal projects located in Bulgaria. Since 2016 I have served as the Project Geologist for the Ngwenya Mining and Exploration (Pty) Ltd ferrous and base metals project in South Africa.

6. I have read the definition of a Qualified Person as set out in NI 43-101as amended in 2011 and certify that by reason of my education, 26 years of relevant experience and professional affiliations, I fulfill the requirements to be a Qualified Person for the sections prepared by myself in the Report.

7. I have not visited the Haib Project site. The work submitted here has been prepared from data received electronically from Deep South Mining Company (Pty) Ltd and Haib Minerals (Pty) Ltd and I have not independently verified this data against originals.

8. As of the date of this certificate, I am not aware of any material fact or material change with respect to the subject matter of the Report, which is not reflected in the Report, the omission of which would make the report misleading.

9. In terms of section 1.5 of NI 43-101 "Standards of Disclosure for Mineral Properties" I am independent of the commissioning entities, being the Issuer, Deep-South Resources Inc, and its subsidiaries and associates Deep South Mining Company (Pty) Ltd and Haib Minerals (Pty) Ltd applying all of the standard tests of independence; Obsidian Consulting Services cc is also independent of the commissioning entities, their directors, senior management and advisors.

10. I have read NI 43-101 as amended on June 30, 2011 and confirm that this Technical Review Report has been prepared in compliance with the Standards and Guidelines as set out in that document.

D.S. RICHARDS B.Sc. (Hons.) Pr. Sci. Nat. MGSSA Dated: 15th January 2018. N LISED E

APPENDIX 1

.

Details of the Deep South Mining Company (Pty) Ltd

Exclusive Prospecting licence 3140

First Granted 22 April 2004



REPUBLIC OF NAMIBIA MINISTRY OF MINES AND ENERGY

EXCLUSIVE PROSPECTING LICENCE (Issued in terms of Section 70 of the Minerals (Prospecting and Mining) Act, 1992)

| Exclusive Prospecting Licence No | 3140 | Office Reference No | 14/2/1/4/2/3140 |
|---|---|---|---|
| Subject to the provisions of the Minhereby issued to | inerals (Prospecting and Mining) Act, | 1992, this exclusive prospect | ting licence is |
| Full Name of Licence Holder | Deep-South Mining Company (P | y) Ltd. | CARLES AND |
| Identity or Passport No (natural pe Company Registration No (compan Address (natural person) or Registe P(0: Box 22978 Windback Nanible | rson) N/A 2003/543 | | |
| Full Name of Accredited Agent (if applicable) Address of Accredited Agent (if applicable) | N/A. | | |
| for the period of 3 years | from (date of issue) .22:Ar | to (date of | expiry) 21 April 2007 |
| This exclusive prospecting licence i Name of Mineral(s)/Group(s) of Mi over a certain portion of land situate Registration Division(s) | s issued in respect of nerals Procloss Metals in Region(s) R V Magisterial District(s) d diagram No EPE 3140 | aras Karasburg signed by the | |
| and is further subject to the terms an | d conditions contained in the notice of | f the Minister's intention to a | mant the |
| icence dated 20 April 2004 | and agreed to in writ | ing by the applicant on | 22 April 2004 |
| Signed at WINDHOEK this | day of | MINISTRY AND EL LOP CONTACT | OF MINES NERGYD |
| MINISTER OF MINES AND ENE | RGY | PRIVATE E. WINDH | AG 13297 IOSK |
| | | OFFIC | IAL |
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REPUBLIC OF NAMIBIA

MINISTRY OF MINES AND ENERGY

Tel (061) 284 8111 Fax (061) 238 643 E-mail: Post master@mme.gov.na Web address: www.imme.gov.na

Private Bag 13297 WINDHOEK

11-0/0001

Enquiries: Mr A lilende

Reference No.: 14/2/1/4/2/3140

20 April 2004

Deep-South Mining Company (Pty) Ltd. P. O. Box 22978 Windhoek Namibia

NOTICE TO APPLICANT OF PREPAREDNESS TO GRANT APPLICATION FOR EXCLUSIVE PROSPECTING LICENCE 3140.

In terms of section 48(4) of the Minerals (Prospecting and Mining) Act, No. 33 of 1992, notice is hereby given that the Minister is prepared to grant your application, lodged on 01 December 2003 for an exclusive prospecting licence in respect of the Precious Metals and Base & Rare Metals Groups of Minerals over a certain area of land as shown in the attached diagram, subject to the terms and conditions contained in the attached schedule, which terms and conditions supplement the terms, conditions and provisions of the said Act.

Your attention is drawn to the provisions of section 48(5) of the said Act which require that within one month from the date of this notice, written acceptance of such terms and conditions must be received by the Commissioner, failing which the application will be deemed to have lapsed.

Kindly acknowledge your acceptance of such terms and conditions by-

- (a) completing the section at the bottom of this notice;
- (b) initialling each page of the schedule and the diagrams; and

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All official correspondence must be addressed to the Permanent Secretary

(c) returning such signed and initialled documents to the Commissioner.

MINING COMMISSIONER

TO THE MINING COMMISSIONER MINISTRY OF MINES AND ENERGY

I. John H' HKuten He. (name of person) in my capacity as applicant/duly authorised officer/approved accredited agent (please delete titles not relevant), hereby accept the supplementary terms and conditions referred to in this notice and contained in the attached schedule which are to be imposed on the grant of the application for exclusive prospecting licence herein referred to.

Signed

Date

.....

Capacity ...

(applicant/authorised officer of applicant if a company/approved accredited agent of a non-resident applicant who is a natural person/authorised officer of such accredited agent......

SCHEDULE OF SUPPLEMENTARY TERMS AND CONDITIONS TO BE IMPOSED ON THE GRANT OF EXCLUSIVE PROSPECTING LICENCE NO. 3140 IN DEEP-SOUTH MINING COMPANY (PTY) LIMITED.

PART 1 - GENERAL

- The exclusive prospecting licence shall endure for a period of three (3) years reckoned from the date of acceptance (hereinafter "the date of issue") of the terms and conditions referred to in this notice unless it is abandoned in terms of section 54 of the Minerals (Prospecting and Mining) Act, 1992, (hereinafter "the Act") or cancelled in terms of section 55 of the Act or on application made to the Minister in terms of section 72 of the Act, it is renewed by the Minister for any further period or periods.
- 2. In consideration of the rights hereby granted, the holder of the exclusive prospecting licence shall pay to the Commissioner for the benefit of the State Revenue Fund, such licence fee as may from time to time be prescribed in terms of section 123 of the Act, it being recorded that the annual licence fee prescribed in relation to the licence at the time of its issue shall be N\$ 2 000 payable annually on or before each anniversary date of the date of issue of the licence.
- 3. In the event that the prescribed licence fee changes, such change shall become effective on the next anniversary date of the date of issue of the licence subsequent to such change.
- 4. The rights under the exclusive prospecting licence shall be limited in extent as stipulated in terms of paragraphs (d) to (g) of subsection 69(2) of the Act; provided that if during the currency of the exclusive prospecting licence, any claim area or area held under any other mineral licence existing on the date of issue of the exclusive prospecting licence which so limited such rights lapses, whether by abandonment, cancellation or expiry, such rights shall not extend to such claim or licence area.
- 5. The Commissioner may by notice in writing require the holder of the licence to beacon off the prospecting area in such a manner and within such a period, which shall not be less than one month, as may be specified in such notice at such holder's own cost.
- The Minister may, in the interest of reasonable development of the prospecting operations, impose from time to time such additional conditions terms and conditions as he may deem fit.

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PART 2 - WORK PROGRAMME AND OBLIGATIONS

- 7. The holder of the exclusive prospecting licence shall-
- 7.1. commence with, and thereafter continue without undue interruption or delay, prospecting operations within one month of the date of issue of the licence in substantial conformity with the proposed work programme, schedule and budget which accompanied the original application for the licence and which served as motivation of the granting thereof:
- 7.2. where any material deviation of such work programme, schedule and budget is in the opinion of the holder of the licence, necessitated by the nature of the results of prospecting operations (but specifically excluding any circumstances of Vis Major provided for in terms of section 56 of the Act), apply in writing to the Minister for approval of the revision of such work programme, schedule and budget in terms of section 75 of the Act;
- 7.3. execute such additional work programme and expend such additional expenditure within a specified period of time as may be imposed by the Minister from time to time;
- 7.4. the holder of the exclusive prospecting licence shall be obliged to secure a Joint Venture partner (who has the technical and financial resources) within one year of the date of issue of this licence; and
- 7.5. the holder of the exclusive prospecting licence shall give a presentation to the Ministry of Mines and Energy regarding the progress made on exploration, within one year of the date of issue of the licence.

PART 3 - ENVIRONMENT

- 8. The holder of the exclusive prospecting licence shall observe any requirements, limitations or prohibitions on his or her prospecting operations as may, in the interest of environmental protection be imposed by the Minister from time to time.
- 9. The holder of the exclusive prospecting licence shall enter into an Environmental Contract with the Ministry of Environment and Tourism and that of Mines and Energy within one (1) month of the date of issue of the licence

MINING COMMISSIONER

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APPENDIX 2

Details of the Deep South Mining Company (Pty) Ltd & Successor in Title, Haib Minerals (Pty) Ltd Exclusive Prospecting licence 3140 After Renewal on 22 April 2017

| MINISTRY OF MIRCE AND ENERGY | |
|--|---|
| With the approval of the Minister of Mines and Energy | this |
| \overline{I} \overline{MD} (2) years | from |
| 22 April 2007 to 21 April 2009 | |
| 15. 09. 2008 Fine Date Commissioner | MINISTF END Minist in approvi Minist in approvi |
| ENDORSEMENT (RENEWAL) ith the approval of the Minister of Mines and Energy, this ineral licence has been renewed for a period of TWO (2) years from 12 April 2009 to 21 April 2011 | NOP MINES AN ORSEMENT (REI I of the Minister of Minister of Minister of Minister of Minister of Minister of Minister (2) P Commission |
| 104/2009 Abbala te MCommissioner | ID ENERGY NEWAL) nes and Energy, this d for a period of d for a period of pril 2015 |
| MIMISTRY OF MINES AND ENERGY ENDORSEMENT (RENEWAL) | MINISTRY OF MINES AND ENERGY |
| With the approval of the Minister of Mines and Energy, this sineral licence has been renewed for a period of $T \cup O \cup (2)$ years from | With this approval of the Minister of Mines and Energy, this mineral licence has been renewed for a period of |
| 22 April 2011 to 21 April 2013 | TWO (2) years from |
| ate P Commissioner | 22 April 2015 to 21 April 2017 |
| MINISTRY OF MINES AND ENERGY ENDORSEMENT (ALIENATION) | Date Commissioner |
| With the approval of the Minister of Mines and Energy, this licence/an interest in this licence has been alienated by transfer/grant/cossion/assignment to, or the joinder as a joint helder of Harb Minerals (PH) 43 | MINISTRY OF MINES AND ENERGY ENDORSEMENT (RENEWAL) With this approval of the Minister of Mines and Energy, this here has been renewed for a period of |
| with effect from 12 April 2013 | |
| Date P.M. Mitth D. Commissioner | 22 April 2017 to 21 April 2019 |
| | 11/09/2017 Line Commissioner |



| Licence | Nr | Lat | Long |
|----------|----|--------------|-------------|
| EPL-3140 | 1 | -28.72530758 | 17.78740212 |
| EPL-3140 | 2 | -28.71183732 | 17.74992010 |
| EPL-3140 | 3 | -28.67100381 | 17.68364770 |
| EPL-3140 | 4 | -28.62124926 | 17.75614951 |
| EPL-3140 | 5 | -28.55535382 | 17.82202069 |
| EPL-3140 | 6 | -28.62443708 | 17.92656044 |
| EPL-3140 | 7 | -28.62670927 | 17.95497900 |
| EPL-3140 | 8 | -28.69475300 | 17.96558957 |
| EPL-3140 | 9 | -28.72089474 | 17.96970697 |
| EPL-3140 | 10 | -28.75324360 | 17.95375930 |
| EPL-3140 | 11 | -28.74086885 | 17.79335440 |

The current map of EPL 3140 and a table of the coordinates. The current area is 36,502.4ha.

APPENDIX 3

Legal Opinion Letter on the Validity of

Exclusive Prospecting licence 3140

As at 12th December 2017

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H. D. BOSSAU & CO

Legal Practitioners / Notaries

49 Feld Street Windhoek Republic of Namibia Telephone (+264)(061) 370 850 Facsimile (+264)(061) 370 855 P.O. Box 1975, Email <u>NicoDP@bossau.com</u>

YOUR REF:

OUR REF: DEE1/0005

12 December 2017

To:

Peter Walker P & E Walker Consultancy CC, 41 Dennekamp, Main Road, Kenilworth, 7708 South Africa

Dear Sirs,

- RE: Namibia: Legal Opinion on the status of certain Exclusive Prospecting Licence Number 3140 issued by the Ministry of Mines and Energy of the Republic of Namibia to Haib Minerals (Proprietary) Limited
- 1. We have been requested by Haib Minerals (Proprietary) Limited ("Haib" or "the Company") to advise on the under mentioned matters.
- 2. We render this opinion, which is given subject to the following conditions and qualifications --
 - 2.1 This opinion is confined to matters of Namibian law and no opinion is expressed as to the laws of any other jurisdiction. We do not purport to be experts on and do not purport to be generally familiar with or qualified to express legal opinions based on any law other than the laws of the Republic of Namibia ("Namibia"), and accordingly, express no legal opinion herein based upon any other laws.

- 2.2 Statements made herein relating to the Company, the Licence and prospecting and/or mineral rights, and other matters dealt with in this opinion are based upon information submitted to us and information obtained from the records of the Ministry of Mines and Energy ("the Ministry"). We cannot ourselves vouch for the accuracy of the information so obtained.
- 2.3 In giving this opinion, we have assumed:
 - the genuineness of all signatures on documents submitted to us as originals or copies of originals;
 - (b) the authenticity and completeness of all documents submitted to us as copies including the actual licence documentation in the form of Exclusive Prospecting Licence Number 3140 ("EPL 3140" or "the Licence"), and that such copies are, in fact, true copies of documents in existence and that the originals of such documents were properly executed and the authenticity and completeness of such originals;
 - (c) the accuracy of the official records maintained by the Ministry tendered to us for investigation and perusal. We point out that the Ministry only facilitated access to the following documents:
 - Licence contacts reflecting an active Exclusive Prospecting Licence registered under Licence Code 3140;
 - Licence contacts reflecting an application for an Mineral Deposit Retention Licence under Licence Code 3140;
 - Application for an Exclusive Prospecting Licence dated 20 April 2017 ("EPL Application");
 - iv. Application for a Mineral Deposit Retention Licence dated 20 January 2017 ("MDRL Application");
 - Licence Details of the Exclusive Prospecting Licence (Exploration) EPL – 3140 dated 21 November 2017; and
 - Vi. Licence Details of Exclusive Prospecting Licence 5327 ("EPL 5327")

and not to any related documentation, such as other or further applications, reports and/or correspondence;

- (d) that the documents dated on or earlier than the date hereof and upon which we have expressed reliance remain accurate;
- that the documents examined are the only documents pertaining to title to the Licence;
- (f) that the persons purporting to execute the documents examined in the course of the title examinations are, in fact, the same persons named therein and, when executed by a corporation or regulatory authority or official, that the persons so executing were duly authorised as signing officers.
- 2.4 In giving this opinion:
 - (a) no investigation has been made of the original applications for filing or renewal (except for the EPL Application in respect to the renewal of the Licence and the MDRL Application), the location of the boundaries of the Licence or the existence of any interest in the Licence other than what was noted on the Licence submitted to us and the Licence Details as made available to us and maintained in the office of the Ministry at Windhoek, on 17 November 2017;
 - (b) no investigation has been undertaken as regards compliance by the Company with the terms and conditions attaching to the Licence, or compliance with the provisions of the Minerals (Prospecting and Mining) Act, Act 33 of 1992 ("the Act");
 - (c) we have not for the purpose of this opinion examined any contracts, instruments or other documents entered into by or affecting the Company, or the rights comprised in the Licence or any corporate records of the Company and have not made any other enquiries concerning the Company, the Licence or the mineral rights in terms thereof.
- 2.5 This opinion is given to you for use in connection with the verification of the mineral licence rights of the Company in Namibia. It may not be relied upon

by any other person or used for any other purpose and neither its contents nor its existence may be disclosed without our prior written consent.

- In regard to the matters requested by you, we are of the opinion that:-
 - 3.1 The Licence
 - (a) As stated above, we inspected the Licence submitted to us during the course of November 2017.
 - (b) We also attach the following documents marked Schedules I III, obtained from the Ministry on 17 November 2017, which reflect all of the particulars of the Licence:
 - A printout from the electronic data base in respect to the Licence contacts registered under Licence Code 3140;
 - II. A copy of the Application for an Exclusive Prospecting Licence dated 20 April 2017;
 - III. A printout from the electronic data base in respect to the Licence Details of the Exclusive Prospecting Licence (Exploration) EPL – 3140 (3140) dated 21 November 2017.
 - (c) Furthermore we noticed that there is another Exploration Prospecting Licence registered in the same prospecting area under number 5327, and requested a printout from the electronic data base in respect to the License Details of the Exclusive Prospecting Licence (Exploration) EPL - 5327 (5327) dated 30 November 2017, marked schedule IV.
 - (d) In addition to the details appearing on Schedule I III we set out below some particulars gleaned from the Licence inspected.
 - (e) Exclusive Prospecting Licence 3140
 - (i) bears the official reference number 14/2/1/4/2/3140;
 - (ii) reflects the Company as licence holder;

- (iii) was originally dated 20 April 2004 and initially issued with effect from 22 April 2004 to 21 April 2007 and was endorsed to reflect the following renewals –
 - A. with effect from 22 April 2007 until 21 April 2009,
 - B. with effect from 22 April 2009 until 21 April 2011;
 - C. with effect from 22 April 2011 until 21 April 2013;
 - D. with effect from 22 April 2013 until 21 April 2015;
 - E. with effect from 22 April 2015 until 21 April 2017;
 - F. with effect from 22 April 2017 until 21 April 2019;
- (iv) is granted in respect of base and rare and precious metals.
 However we wish to point out that the Licence excludes Industrial Minerals which were applied for in the EPL Application;
- (v) is granted in respect of a certain portion of land situated in the Karas Region, Registration Division V, in the Magisterial District of Karasburg, as depicted in the diagram No. EPL 3140 attached to the Licence;
- (vi) diagram No. EPL 3140 attached to the most recent renewal reflects the Licence area as being 36589.1879 hectares in extent;
- (vii) is subject to the supplementary terms and conditions contained in the most recent Notice of the Minister of Mines and Energy's Preparedness to Renew the Licence dated 28 August 2017 in respect of a renewal application lodged on 20 April 2017, a copy whereof is appended to the Licence, entitled as more fully described in paragraph (viii) immediately below;

- (viii) is subject to the terms and conditions set out in the schedule entitled "SCHEDULE OF SUPPLEMENTARY TERMS AND CONDITIONS TO BE IMPOSED ON THE GRANT OF THE RENEWAL OF EXCLUSIVE PROSPECTING LICENCE NO. 3140 In Favour Of Haib Minerals (Pty) Ltd" ("the Terms and Conditions");
- (ix) reflects that the Minister's Notice of Preparedness to Renew mentioned in paragraph (vii) was accepted by the Company on 31 August 2017;
- (x) does not reflect any encumbrances, liens or charges of any kind. However, there is no way of ascertaining whether the Licence has been encumbered, or is subject to any lien or charge, as there is no mechanism for this to be recorded in any public office, since the legislation does not provide for this.
- (d) The Company is the registered holder of the Licence, which has on the face thereof been validly granted in accordance with the applicable laws and which is in effect and valid in accordance with its terms.
- 3.2 While we urge you to have regard to the full terms and conditions imposed in respect of the Licence reported on, we would briefly like to comment on the content thereof, as follows:
 - (a) The first part of the Terms and Conditions deals with the term for which the Licence is granted, being a period of two (2) years, and prescribes the annual fee that is payable by the Licence holder, namely NAD4,000.00 (four thousand Namibia Dollar). It is also provided that in the event of an increase in fees during the term of the Licence, the increased fee is payable with effect from the next anniversary date of the renewal of the Licence, subsequent to such change. The terms and conditions then further draw specific attention to the provisions of Section 69(2)(d) to (g) of the Act. This in essence means that the Licence does not extend in respect of minerals or groups of minerals for

which it is not granted, and also specifically excludes any pre-existing mineral rights belonging to third parties that may be in existence in the Licence area. It is also provided that where there are pre-existing third party rights which lapse during the term of the Licence within the Licence area, these shall be included as part of the Licence. It is also provided that the Minister may in the interests of the reasonable development of the prospecting operations impose additional terms and conditions on the Licence holder.

- (b) The second part of the terms and conditions provides that the licence holder shall commence and continue with the proposed work programme, schedule and budget of expenditure to be incurred which accompanied the application for the Licence (or, if applicable, the application for renewal thereof) and which served as the motivation for the granting thereof. Any material deviation from such work programme, schedule or budget requires notification to the Minister, and Ministerial approval for any proposed revision in terms of section 75 of the Act. There is also a condition to the effect that the Minister may impose on the licence holder the obligation to undertake an additional work programme or additional expenditure within a specified period as may be prescribed from time to time.
- (c) There is another condition to the effect that all funds raised anywhere and exclusively in respect of this Licence shall be expended on the Licence and all/any activities relating thereto, to the extent that such funds are to be expended directly in Namibia, the Licence holder shall ensure such funds are remitted to a reputable financial institution in Namibia.
- (d) The Licence holder is furthermore required to make an oral presentation to the Ministry after the first year of the Licence tenure.
- (e) The third part stipulates that the Licence holder must observe all requirements, limitations or prohibitions imposed on the prospecting operations as may in the interests of environmental protection be imposed by the Minister from time to time. It is furthermore provided that

the Licence holder shall adhere to the environmental contract with the Ministry of Environment and Tourism and the Ministry of Mines and Energy already concluded in respect of the Licence.

- (f) In terms of the Environmental Management Act, 2007, additional requirements as regards compliance with this Act should now also be complied with by the Licence holder. We have not been instructed to investigate such compliance and have accordingly not done so.
- (g) The fourth part prescribes additional conditions which must be met within 60 days after the acceptance of the Notice of Preparedness, by submitting a detailed description on the structure and composition for the Company, together with a proposal (the "Proposal"), addressing the Government's objectives of poverty eradication, to the Minister. We wish to point out that the additional conditions had to be complied with on or before 30 October 2017. We are not informed as to whether this was complied with or not.
- (h) The conditions in respect to the structure and composition of the Company set out that the management structure of the Company shall be represented by a minimum of 20% historical disadvantaged Namibians and a percentage of at least 5% of the shareholding of the Company shall be held by Namibian persons or a company wholly owned by Namibians.
- (i) The Proposal should further address the Government's objectives of poverty eradication by providing an opportunity for Namibian participation, as well as setting out a strategy to benefit the Namibian youth and women particularly from the disadvantaged groups and the poorest of the poor. We have not been instructed to investigate such compliance and have accordingly not done so.
- (j) The Minister may subsequently propose amendments within 30 days, after receiving the proposal, which would enable the Company to support the Government's objectives for broad based empowerment and poverty eradication. Where the project is economically significant, but
the proposed structure of the Company does not meet the Government's objectives, the Minister shall have the right to propose amendments in writing to the Company, to meet these objectives of the Government.

- (k) If the Company is dissatisfied with the counter-proposal of the Minister it had to make written representations to the Minister within 30 days from the date of the Minister's counter proposal and after consideration, the Minister should have notified the Company of the final terms and conditions on which the Minister is prepared to grant the Exclusive Prospecting Licence.
- (I) As indicated above, we are unable to confirm that the Company has indeed complied with all these Terms and Conditions or any other terms and conditions provided for in the Act. However, as appears from paragraph 3.5 below, compliance with the applicable conditions is one of the aspects that the Minister must be reasonably satisfied with prior to granting the renewal of a licence. In the absence of compliance it is unlikely that the Licence would have been renewed on the several occasions that it has been renewed, including for its current tenure.
- 3.3 As regards renewals, we point out that renewal applications shall be made not later than ninety (90) days before the date on which a Licence expires, or such later date, but not later than the expiry date of the Licence, as the Minister may on good cause shown allow. Where an application for renewal is made late, it is therefore necessary to show cause and request condonation for the late application. It appears that the latest renewal was only applied for on 20 April 2017, that is, one day before the then current term expired. However, prior to this, on 20 January 2017 the Company had submitted the MDRL Application and as such there appears to have been a renewal application as a cautionary measure to preserve the existing rights. The lateness of the renewal application in our view therefore should not pose a problem.

It is furthermore provided that in the case of a first application for the renewal of a Licence it shall not be made for an area greater in extent than seventy five percent (75%) of the prospecting area comprising the initial area of grant,

and, in the case of further renewal applications, in respect of any land greater in extent than fifty percent (50%) of the prospecting area existing at the date of such application, unless the approval of the Minister has been obtained to retain a larger area. The Minister may on renewal approve a larger area in the interests of the development of the mineral resources of Namibia and on good cause shown by the holder of the licence in question. No reduction was applied for with the renewal, but again in our view this should be linked to the MDRL Application and accordingly acceptable.

The Minister shall also not grant an application for renewal unless the Minister is on reasonable grounds satisfied with the manner in which the programme of prospecting operations has been carried out, and the expenditure expended in respect of such operations.

While a renewal application is being considered by the Minister the exclusive prospecting licence which is the subject of such renewal application remains valid, even where the initial term has expired, until such time as the outcome of the renewal application has been determined.

We also wish to address the provisions of the Act dealing with renewals, and more particularly the acceptance by a licence holder of a Notice of Preparedness to Grant a Renewal issued by the Ministry. The provisions of section 48(5) provide that within one month as from the date of a Notice of Preparedness, or such further period as the Minister may on good cause shown allow in writing, the applicant must agree in writing to accept the terms and conditions attaching thereto or such other terms and conditions as may be agreed upon, failing which the application in question shall lapse on the expiration of such period. As per paragraph 3.1(c)(ix) this was complied with if regard is had to the most recent acceptance of the Notice of Preparedness to Grant a Renewal by the Company within three days of the Ministry's notice.

Any exercise of discretion by the Minister must be undertaken in accordance with the general principles of administrative justice, and the Minister is

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146

expected to act fairly and reasonably in doing so. This is relevant to the consideration, among others, of any renewal applications in relation to the Licence.

All administrative acts are presumed to have been lawfully done or performed until proof to contrary has been adduced. It is technically possible for a third party to challenge licence rights on the basis that the third party's rights have been infringed or some administrative process was not properly followed, or a discretion was not properly exercised. However, until successfully challenged by someone with the legal standing to do so (that is, some right or connection to the licence and the Ministerial decision in question) and set aside by a court of law, a licence is at least prima facie valid. An application to have the licence set aside must also be brought within a reasonable time. The rule of practice has developed that this means that an application must be launched within three (3) to six (6) months from the date of grant of a licence. The purpose of this time limitation is to arrive at finality and create certainty. In any review application challenging the grant of a licence the Ministry would be obliged to make available a complete record of the decision making process, comprising all documentation in relation to the decision that was taken. By virtue of this discovery process it is therefore possible for an applicant to extract information, and even an application brought on flimsy grounds could as a result be substantially amplified and raise new review grounds where there were shortcomings that appear from the record.

3.4 A licence holder must also enter into a surface rights usage agreement in respect of the land over which the licence rights, or some of them, extend; provided that the land in question is privately owned. In terms of section 52 of the Act a licence holder must have an agreement in writing with the landowner before being in a position to exercise licence rights. Where no such agreement is in place the licence holder may be granted an ancillary right as provided in section 110(4) of the Act. An ancillary right may be applied for in terms of section 109. The Ancillary Rights Commission constituted by the Act has sittings at times determined by it, and usually is convened on a quarterly or half yearly basis. An application for a grant of

ancillary rights is therefore likely to be coupled to delays. In instances where licence rights extend over State Land no surface right agreement is required.

- 3.5 We would also like to point out that in terms of section 47(3) of the Act the provisions of section 39(6), (7) and (8) of the Act apply in the case of a transfer, cession, assignment or grant of an interest in a mineral licence. Accordingly, all rights, liabilities and obligations which vested in the licence holder immediately before such transfer, cession, assignment or grant, shall vest in the new licence holder from the date of the transaction. This includes all pre-existing environmental damage.
- 3.6 Kindly be advised that Ministerial approval is required where a transfer, cession, assignment or grant of an interest in a mineral licence is contemplated. Where a transfer of shares in the licence holder is contemplated, only notification of the change in shareholders is required.
- In this context it should be noted that the Act also affords the Minister the 3.7 power to cancel a mineral licence in certain circumstances. In respect of corporate entities the grounds are limited to a failure to comply with the terms and conditions of the mineral licence or of the provisions of the Act, and where a company is wound up in terms of the provisions of the Companies Act, 2004, other than for the purposes of amalgamation or reconstruction undertaken with the prior approval of the Minister. A licence may not, however, be cancelled unless the Minister has first given written notice to the licence holder informing the licence holder of the intention to cancel the mineral licence and setting out particulars of the failure complained of as well as calling on the holder to make representations. The Minister is also obliged to consider any steps taken by the holder to remedy the failure in question or to prevent any such failure from being repeated during the currency of the mineral licence and any other matter submitted by way of representations. Non-compliance by the licence holder due to vis major is not, in terms of the Act, regarded as a failure to comply with terms and conditions or provisions, provided that proper notice must be given of such events.
- 3.8 Based on the records inspected by us, we are not aware of any breaches being noted thereon in respect of the Terms and Conditions attaching to the

12

Licence by virtue of the Licence Terms and Conditions themselves or in terms of the Act.

- 4. In regard to MDRL Application registered under Licence Code 3140:
 - 4.1 The MDRL Application
 - a) As stated above, we inspected the MDRL Application at the office of the Mining Commissioner, at the Ministry, on 17 November 2017. We also attach, marked Schedule V, a copy of the application obtained from the Ministry on 17 November 2017 herewith.
 - b) In addition to the details appearing on Schedule V we set out below some particulars gleaned from the MDRL Application inspected.
 - c) The MDRL Application---
 - (i) bears the official reference number 14/2/1/4/2/3140;
 - (ii) reflects the Company as Applicant;
 - (iii) was filed on 20 January 2017;
 - (iv) is in respect of precious metals, base and rare metals, dimension stone, industrial minerals, precious stones and semi-precious stones;
 - (v) is in respect of a certain portion of land situated in the Karas Region, Registration Division V, in the Magisterial District of Noordoewer, as depicted in the diagram attached to the MDRL Application.
 - 4.2 Kindly take note that the MDRL Application is still pending the approval of the Minister of Mines and Energy.
 - 4.3 Although we inspected the MDRL Application we cannot confirm the accuracy or completeness of the information provided therein.
- In regard to the prospecting area of the Licence and the MDRL Application, we also wish to draw your attention to EPL 5327 which we inspected at the Ministry of Mines and Energy on 30 November 2017.

- 5.1 In addition to the details appearing on Schedule IV we set out below some particulars gleaned from the Licence Details of EPL 5327 as inspected.
 - a) Exclusive Prospecting Licence 5327 -
 - reflects the licence holder to be Namibia Hau Yan Resources Explo & Devel (Pty) Ltd;
 - ii. it appears from the Licence Details that an application was initially filed on 17 May 2013. Subsequently the licence holder filed an application for a renewal on 14 October 2016;
 - the status of the renewal is still pending and the application had not been approved on the date we inspected the Ministry's available records;
 - iv. the initial EPL 5327 was granted in respect of industrial minerals and precious stones.
- 5.2 We wish to point out that the Act prescribes that the Minister may grant to any person in respect of the prospecting area to which an exclusive licence relates an exclusive prospecting licence, mining licence or mineral deposit retention licence in respect of any mineral or group of minerals other than the mineral or group of minerals to which such first-mentioned exclusive prospecting licence relates.

It appears from the licence details of EPL 5327 that Namibia Hau Yan Resources Explo & Devel (Pty) Ltd, holds an exclusive prospecting licence for industrial minerals since 29 October 2013. This presumably explains why the Ministry denied the Company's application for industrial minerals to be included in the Licence area as per the EPL Application.

Furthermore we noticed from the MDRL Application that the Company applied to include precious stones as a commodity. Kindly take note that Namibia Hau Yan Resources Explo & Devel (Pty) Ltd currently holds an exclusive prospecting licence for precious stones and industrial mineral over the same area.

The Company will therefore not be able to apply for a any licence in the prospecting area covered by EPL 5327 in respect to industrial minerals or precious stones, unless the Minister refuses the renewal application of Namibia Hau Yan Resources Explo & Devel (Pty) Ltd which is pending.

5.3 We also noticed further that the Company applied for the inclusion of dimension stone in the MDRL Application.

The Act prescribes that no person shall apply for a mineral deposit retention licence, unless such person is the holder of an exclusive prospecting licence or mining claim in relation to the area of land and the mineral or group of minerals to which his or her application relates.

According to Section F of the MDRL Application, the Company holds no other mineral licences including claims, except for EPL 3140, under which Licence number the MDRL Application is brought.

It is therefore our view that the Ministry may only approve the Company's MDRL Application in respect of base and rare and precious metals, provided the Minister is satisfied with all the prescribed requirements in the Act in respect to the said Application, are complied with.

Notwithstanding the above, the Company may apply to the Ministry to amend its Licence to include dimension stone, and should thereafter apply for the amendment of the mineral deposit retention licence (once approved by the Minister), to include dimension stone.

Kindly take note that an exclusive prospecting licence should be amended every time the licence holder wishes to add an additional mineral or group of minerals to its licence rights. We trust that this opinion is of assistance to you and remain available should you have any further questions herein.

Yours faithfully,

H.D. Bossau & Co. Per: Ne.A. N.C. du Plooy 1